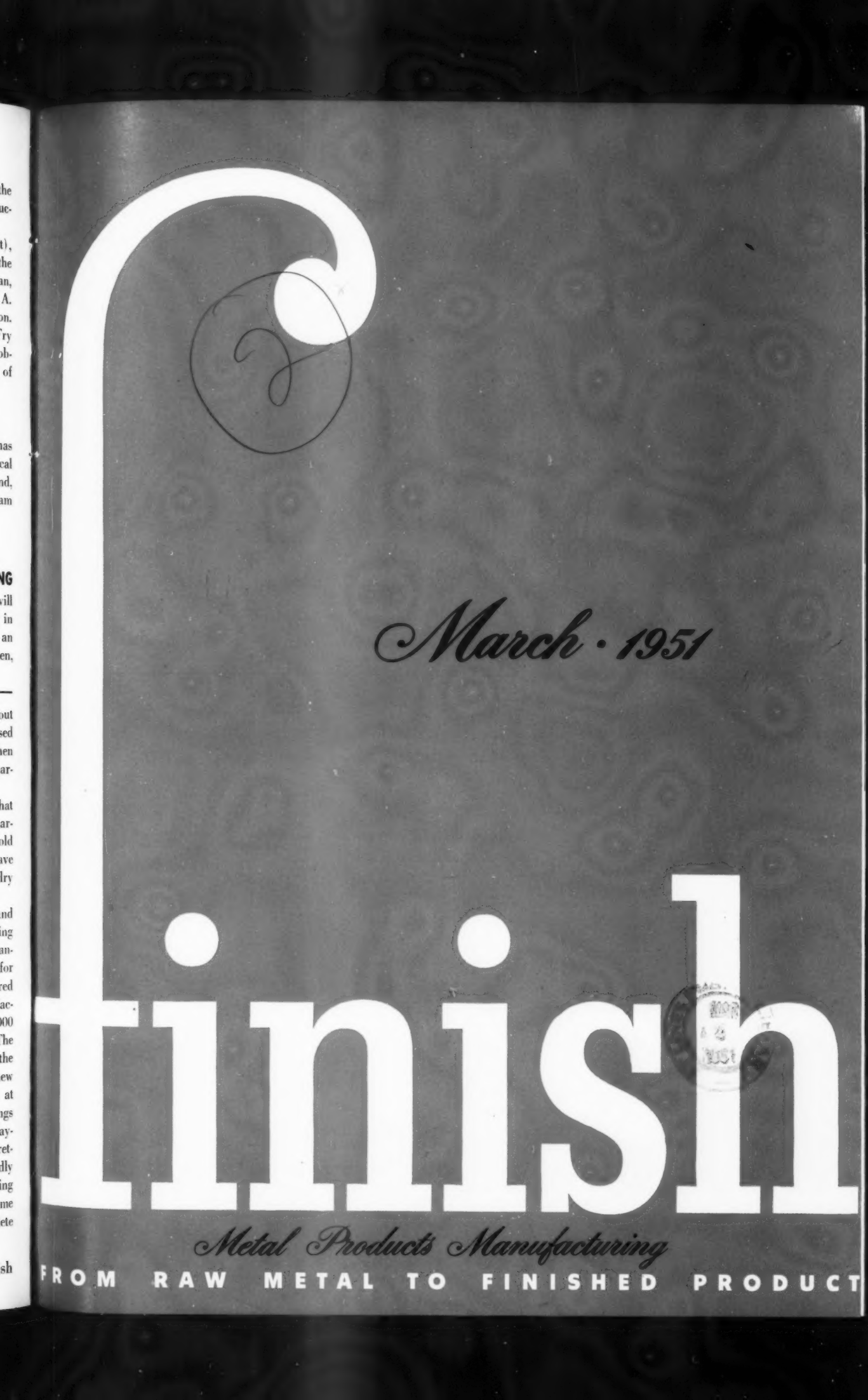
March · 1951
finish
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FROM RAW METAL TO FINISHED PRODUCT

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"Ceramic" Colors

CERAMIC COLOR & CHEMICAL MFG. CO.
New Brighton, Pa., U. S. A.

WENNING CERAMIC COLORS

News from Washington

by Orville Johnson • (AS OF FEBRUARY 13, 1951)

THE requirements to be placed upon the nation's industrial production capacity take shape as a definite policy on the pace and form of rearmament is affirmed. Top Washington policy makers appear somewhat apprehensive about public ability to endure, short of full-scale war, a semi-mobilization of unknown duration. Morale is viewed as important in a long drawn-out part-war, part-peace economy. Though civilian goods will be curtailed, every attempt will be made to maintain a flow of consumer products to the extent that defense requirements will allow.

Accordingly, the defense establishment has placed dual responsibilities upon industry's facilities: (1) the production of arms for authorized military force of 3,500,000, and (2) the creation of armament capacity (rather than a stock-pile of arms and equipment) against the day when an emergency might require a speeded-up output of arms.

To carry out these objectives, a broad base of productive capacity is being laid. Facilities for making steel, aluminum and other needed materials are expanding, and defense plants are being readied by both conversion and construction. As these facilities increase, planners hope that, in a period short of full war, both defense requirements and limited civilian output can be handled.

Now, as industry tools up, an increasing volume of defense contracts is being placed. Defense production will rise steadily during 1951 to a peak in 1952 and early 1953, keeping almost constant pressure on civilian production during that period. Present planning calls for some let-up on consumer controls by 1953 if world developments do not cause abandonment of our semi-mobilization tactics for full-scale armament.

Freezes aim to slow inflationary tendencies

Price and wage freezes signify one more step toward increased regulation. The effect of these and other controls being invoked are much like those of World War II — loose at first, but ready to be tightened should the *emergency* become increasingly serious. Once again, voluntary schemes have not been effective and compulsory ones follow. Even these, however, will not be completely rigid. For example, price or wage freezes are not freezes at all; they are merely restraints aimed to slow rises.

Prices and cost of living will inch upward. Wage increases — sixth round — are in sight. Unions, insisting on increases, will assure higher wages for all workers. More pay will also be used to lure workers in the tightening labor market.

Materials controls

The supply of critical materials that is available for civilian production gets tighter and tighter as government bans are extended. The effect of these restrictions will become increasingly apparent as the pinch increases. The list of materials affected continues to grow.

Aluminum — The order affecting aluminum use (Amendment 2 to NPA Order M-7) prohibits its civilian use in more than 200 products ranging from cocktail shakers and toys to storm windows and venetian blinds. The effective date of the order is April 1. After this date a manufacturer cannot use more aluminum or a better grade of aluminum than is necessary for functional operation. After June 1, the use of aluminum is banned for any items to be used solely for decorative or ornamental purposes.

To assure sufficient aluminum for defense orders, the ceiling was raised (under Amendment 1 to NPA Order M-5) on the amount of capacity that aluminum producers and fabricators must devote to defense orders. There is no change in the percentage of D.O.-rated orders that distributors and jobbers must accept.

Nickel — The use of nickel and nickel products is prohibited in more than 400 non-essential items starting March 1. (by NPA Order M-14, Amendment 1) After March 1, *nickel silver* and *nickel plate* cannot be used for a variety of products including household appliances, metal furniture, utensils. Starting April 1, *nickel bearing stainless steel* and *high nickel alloys* are curtailed for use in a list of other products including much automotive equipment, domestic appliances. There is no ban, however, on the manufacture of any of these items if other materials are used.

Copper — The previously imposed bans on civilian use of copper, effective March 1, are causing considerable adjustments on the part of all industry dependent upon this important metal.

To ease the impact somewhat, Direction 1 to NPA Order M-12 permits users and producers of copper and copper-base alloys to readjust their base period use averages where operations were stopped for 15 consecutive days during the first half of 1950. Also, miscellaneous producers of copper and copper-base alloys are now allowed to melt and process copper scrap generated in their own plants. Previously only refineries, ingot makers, wire mills and foundries could rework their own copper scrap.

Tin — After March 1, the use of pig tin, and tin alloys is prohibited for a number of specific purposes except by direction of NPA. All other uses are banned. *Tin plate* and *terne plate* use is also specifically limited. The use of tin, tin plate and terne plate for *cans, closures* and *collapsible tubes* is sharply curtailed.

Tungsten and Molybdenum — These materials, important in the manufacture of high speed steels have been brought under government control. (NPA Orders M-30 and M-33)

Steel — NPA officials have disclosed that, effective April 1, a cut of from 25 to 40 percent is expected in the amount of steel that may be used for manufacture of durable consumer goods. Major appliances and automobiles are to be included in the limitation. Present indications call for aluminum and copper to be cut in this manner, also.

The order will not fix the number of stoves, refrigerators, and autos to be manufactured. Instead, producers can use their allocation as they choose, and they can stretch their supply of materials as far as they can by ingenuity and substitution of other materials.

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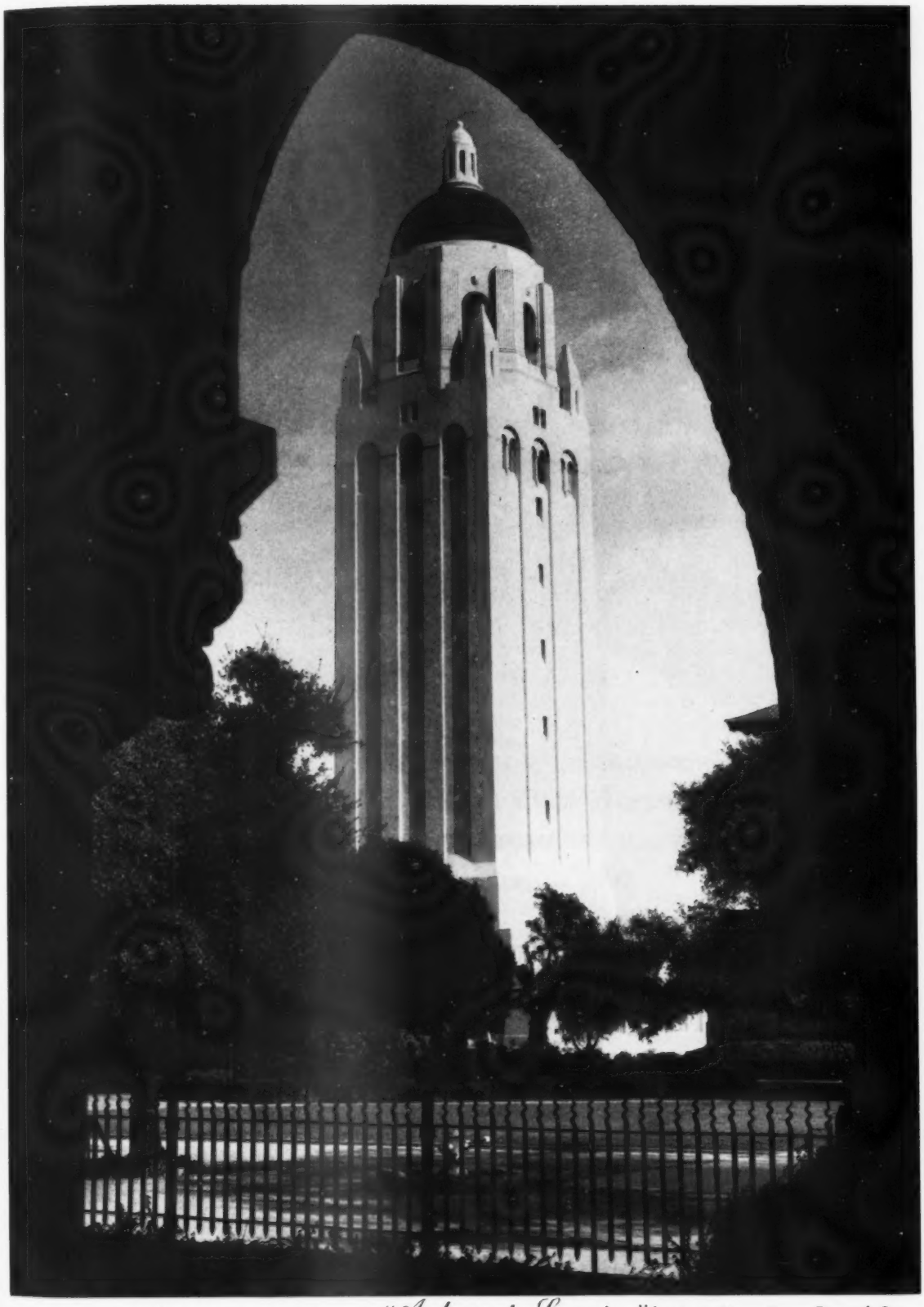

Camera: Folding 616 Kodak, 1/25 sec. at f/16
Film: Verichrome

"Archway to Learning" by L. L. Moss, Ferro Enamel Corp.
(Hoover War Memorial Library, Stanford, University)

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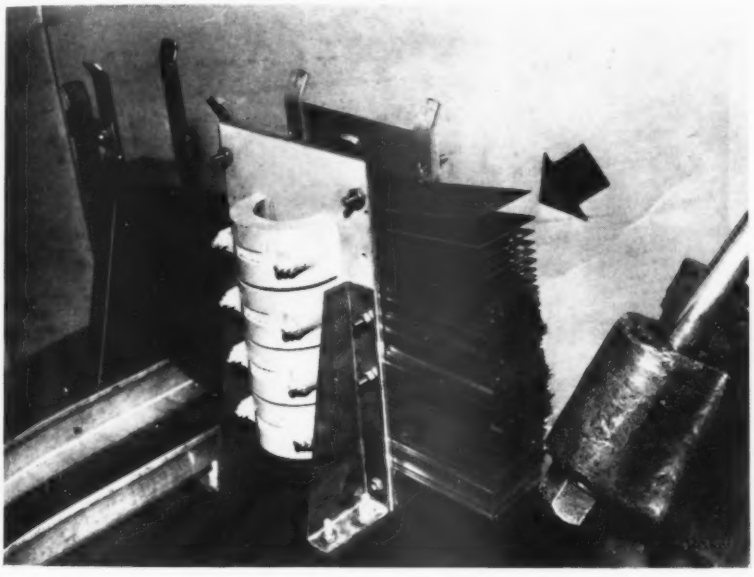
finish SUGGESTION BOX

Magnetic sheet separator speeds handling of steel for stamping presses



DIFFICULTY in separating sheets of steel for feeding into stamping presses and press brakes is eliminated by means of a new moderately priced non-electric, permanent-type plate magnet unit. Known as a magnetic sheet floater, the unit is said to substantially speed up sheet handling. Glove damage and injury to workers in the form of cuts from sharp edges is also reduced.

In construction, the sheet floater consists of powerful magnets, a stainless steel mounting bracket and a stainless steel wearing plate welded into a single compact unit. In principle, the sheet floater induces a magnetic field in the sheets in such a manner that the sheets repel each other causing the ends to float or fan out with air space between them. Separated in this manner, the top sheet can easily be grasped by the worker and fed into the press.

The number and size of units required and their positioning depends upon the size, weight, and shape of the sheets. Blanks and irregular shapes can also be separated.

***Source for further information on this steel sheet separator may be obtained by writing* finish.**

WASHINGTON BRIEFS

● "HELP WANTED" SIGNS are going up across the nation. The shortage of skilled workers is especially critical, and it is only the beginning. Before the year is out defense industries will have to find 4,000,000 more workers. Manpower officials are concerned, for the manpower shortage could well be the limiting factor in the nation's production.

● THE AVAILABLE SUPPLY OF COBALT is expected to be increased 4½ million pounds by late 1952, Washington officials report. A new method of separating cobalt from domestic ores, previously thought to be uneconomical to process, is viewed favorably in the light of preliminary research. Prior to the present national emergency, only 8 million pounds of cobalt were used annually.

● MACHINE TOOL REQUIREMENTS for defense will be aided by an expected order giving priority to D.O.-rated orders. Emergency productive schedules will be set up whereby machine tool makers will be asked to schedule 70 percent of their capacity for defense orders. NPA authorities indicate the order will be effective in April.

● A CONTROLLED MATERIALS PLAN calling for complete rationing of steel, copper, and aluminum is scheduled to be imposed on the metal-working industries. Patterned after the World War II program, it is to take effect by mid-year. Work is going forward, and personnel is being lined up now to handle the increased load of work. Signs of faltering in the present D.O. plan is tending to move the CMP effort forward rapidly.

● SIMPLIFICATION ORDERS which limit the number of sizes of civilian goods are in process. Planners are investigating ways to standardize and simplify consumer products. This will save materials, and it is also hoped that more materials can be diverted into lower and medium priced items.

● PAINT MANUFACTURERS have told NPA officials that the supply of containers is the industry's greatest problem at the moment. They report that the recent NPA order restricting the use of tin in containers is having serious effect.

● STEEL EXPANSION continues. For 1951, the industry will spend 1.2 billion for expanded and improved facilities. In 1952, the outlay will be at least as great. By the end of 1952, the annual production level is expected to be 117,500,000 tons as compared with present capacity of 104,230,000 tons.

INLAND DATA for STEEL USERS

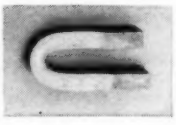
INLAND STEEL CO.

38 S. Dearborn Street, Chicago 3, Illinois

Typical mill tests for quality control of your steels

An important aspect of steel manufacturing is that, in the great majority of cases, steel is "tailor-made" to meet a specification or to make a particular part. It is therefore necessary for the steelmaker to know as much about each heat of steel as can be efficiently obtained. The tests described below are the main tests run by the steel producer to check the quality of the steel against the specified requirements. Naturally these tests do not stand alone as the final quality determinants. The steelmaker uses many other tests and his metallurgical experience as well as his knowledge of the steel fabricating processes to assure the customer of the right steel for the job.

1



2

BEND TEST

Bend tests are employed to determine the ability of steel to withstand cracking during subsequent forming operations at the customer's plant. Basically, the test consists of bending test pieces through certain specified arcs. (photos 1 and 2). The amount of bending a piece of steel will withstand depends on its chemical composition, its tensile strength, its thickness, and its grain structure.

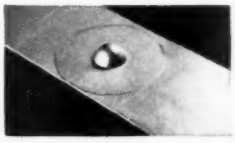
3

HARDNESS TEST

Abrasion, indentation, wear, cutting and shearing . . . all these are related to the hardness factor of the steel. Hardness tests are most often made after the steel has been heat-treated or just before it is to be temper rolled. Hardness is measured by Rockwell or Brinell testing machines (photo 3) which indent the surface of the specimen with a predetermined load. The relationship of the load and depth of indentation is then translated into a hardness reading.

CUPPING TEST

Clues to a steel's suitability for future drawing operations are uncovered by the cupping test. In this test, a sample piece of steel is placed in a special machine in which a smooth metal ball is forced against the flat surface of the specimen thus drawing it into the form of a cup and continuing the distortion until the material is fractured (photos 4 and 5).

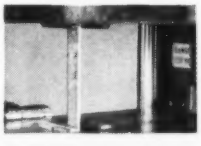


4

5

TENSION TEST

In applications where the steel will be under stress, either static or dynamic, the steel mill quality control department is interested in determining certain mechanical properties of the steel . . . tensile strength, yield point and the amount of elongation in a specimen of a certain length. Specimens of the various products are pulled asunder until fractured by hydraulic or mechanical testing machines which accurately measure the applied load (photos 6 and 7).



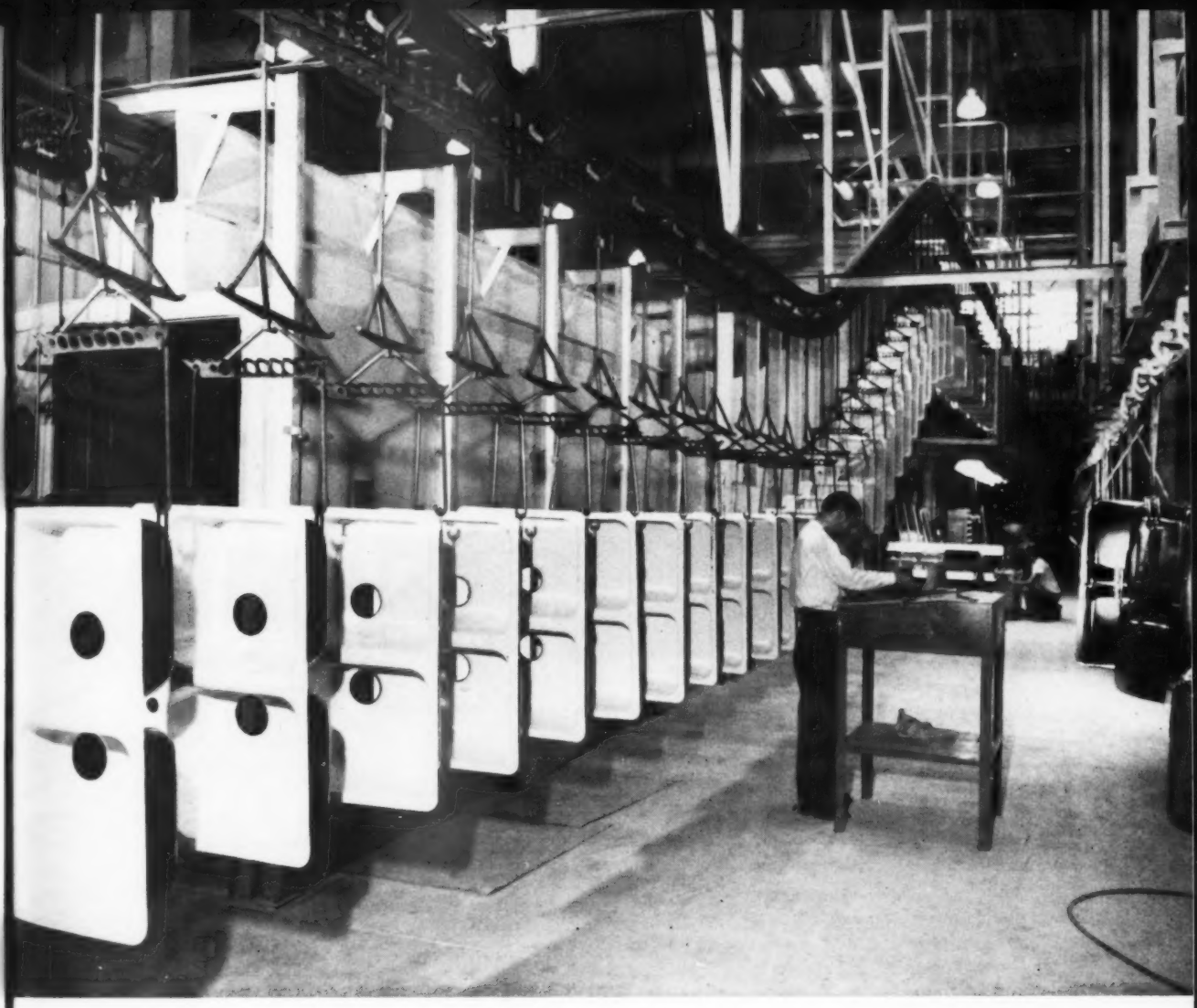
6

7

CHEMICAL DETERMINATION

The most widely used tests for quality control of steel at the mill, are the tests which determine chemical compositions of the raw materials and the finished products. It is estimated that Inland runs 1,250,000 chemical determinations each year. In addition to the wet chemical tests, the spectrographic method (photo 8) is widely employed for making quick, accurate determinations.

8



A highly mechanized plant for sinks, bathtubs and kitchen cabinets

a highly mechanized operation which employs liberal use of overhead conveyors and close control over finishing operations

by Warren Walker • INDUSTRIAL ENGINEER, MINNEAPOLIS-HONEYWELL REGULATOR CO.
AND *Matt E. Heuertz* • ASSOCIATE EDITOR, FINISH

THIS article covers the facilities of Kaiser Metal Products, Inc., in Bristol, Pennsylvania, for the production of bathtubs, sinks and kitchen cabinets. The present layout includes a remodeled and equipped fabrication and synthetic finishing division (Plant No. 1), and an entirely new porcelain enameling division (Plant No. 2).

The entire operation is located on a 58-acre tract, with the two plants located on opposite sides of Radcliffe Street. To illustrate the highly mechanized nature of the operation, Kaiser engineers point to their 15 independent conveyor systems, with over 14,000 feet of overhead chain conveyors serving all shops and linking the two buildings.

The remodeled fabrication department utilizes a total of 62 presses, including a new 1800-ton double action mechanical press used for draw-

Left: A section of the heavy press area in the remodeled fabrication department located in Plant No. 1.

ing bathtub and sink stampings. On certain operations this new press is used as a trimming and forming press with five dies in the press bed at one time.

There are three press areas in the department, namely, the heavy, medium, and light press shops. The heavy double-action presses range up to 2500 tons, the medium single-action up to 200 tons, and the light presses up to 100 tons.

Fabrication procedure

In the forming of steel plumbing ware (black shapes), the procedures follow the same general methods with variances due to the number of sumps or bowls for each type of ware. Only one sump or bowl is formed from one piece of sheet metal, with double-sump units formed from two sheets.

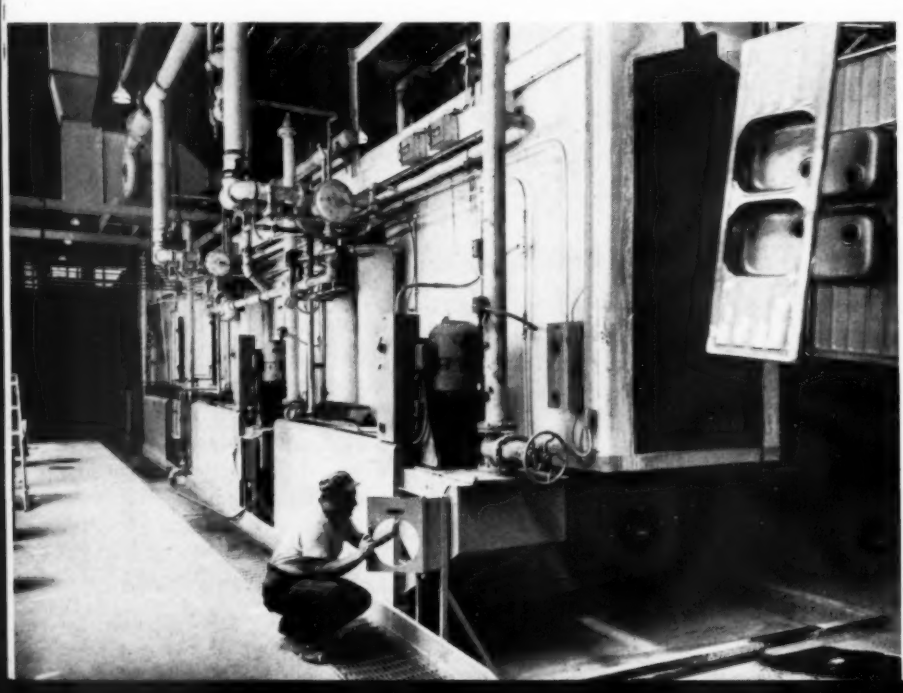
After shearing to size, steel blanks are fed through a roller-leveller machine which levels the blanks and removes certain strains in the metal, thus improving the surface. The blanks then pass through lubricating rolls which coat both sides with drawing compound in preparation for forming operations.

For single-bowl sinks, the first step takes place in a double-action 1800-ton press fitted with double-action contour dies. Other operations follow on presses having the following types of dies: trim die; flange and emboss die; back splash panel forming die; and rim dies for removing excess metal from the corners of the ware and for punching utility holes in the sink. The last press operation consists of bending a protective flange on the outer rim of the sink.

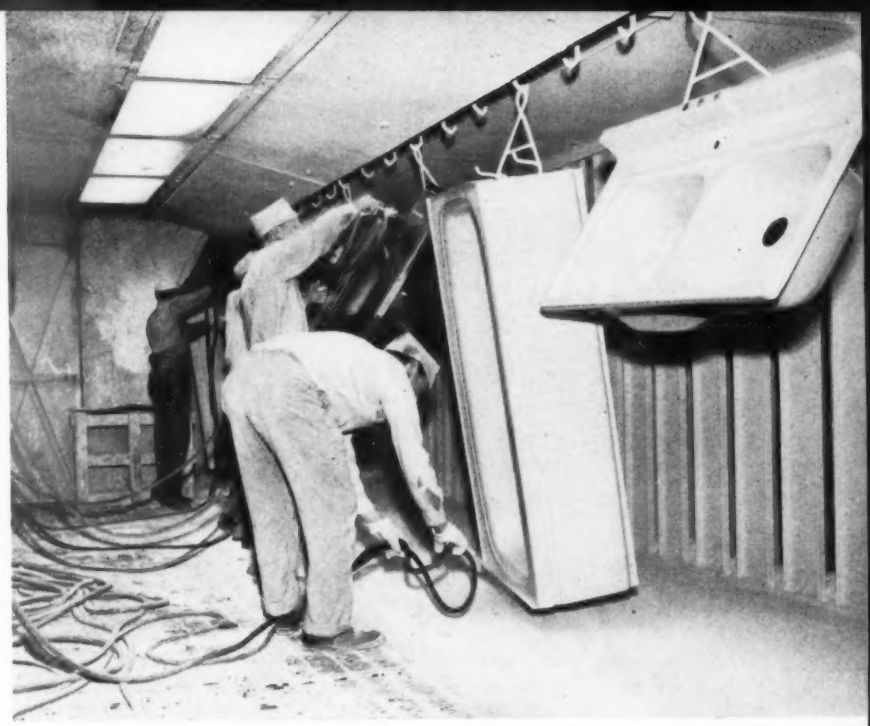
For double-bowl sinks, each bowl or sump is drawn from an individual blank sheet. Following draw and trim operations, the right and left bowls are welded together to form a complete double-bowl sink blank. Another forming operation in a double-action press completes the final depth and shape of the two-bowl unit. Six more steps complete the forming operation and consist of: final trim of entire blank form; forming the grooves of drainboard and soap holders; forming outer rim or flange of sink; form back splash panel or riser; trim the corners and pierce all holes; and bend protective flange on outer rim of the sink.

For bathtubs, the tub and front apron are formed as individual parts and then welded together with support braces.

The tub stamping is a single piece drawn from metal prepared on the shears and roller-leveller. Forming operations take place in five presses fitted with six dies and a special air-operated fixture for piercing the overflow hole. The press steps are as follows: draw shape on double-action 1800-ton press; size and emboss the tub; trim excess metal from stamping; pierce drain hole and flange same; and trim the flange which attaches to the apron, and pierce the drain hole. The apron is formed through four press operations, and then welded to the tub stamping.



Left: Automatic spray pickling line in Plant No. 2, showing sinks entering machine for cleaning.



Right: Four sprayers can work simultaneously in one of two 30-foot pressurized cover coat spray booths.

The sink assembly area has a capacity of 1840 units per 15-hour day, while the production capacity of the tub assembly line is rated at 60 tubs per hour.

Metal finishing

Following fabrication, the "black shapes" are taken by conveyor through washing and drying machines and on to the metal finishing department. Here necessary furnace hanger brackets and braces are welded to the ware. Weld marks, scratches and other surface defects are removed by grinding and buffing with the operations all performed on the conveyors. Following rigid inspection, the ware leaves the building, proceeding to the pickling department in Plant No. 2 via overhead conveyors.

Automatic spray pickling

A continuous pickling machine was installed at the south end of the enameling plant to process the following items: 21″ flat rim sinks, hung four per hanger; larger sinks, hung two per hanger; and bathtubs, hung one per hanger. The machine handles 90 hangers of work per hour when the conveyor is operated at 5 feet per minute. Each unit of work passes through the following stages of the pickling machine:

Spray	*Temp. (F.)*	*Time*
Alkali cleaner	170°	1 min.
Water curtain		
Alkali cleaner	180°	1 min.
Alkali rinse	Cold	¾ min.
Sulphuric acid	155°	3 min.
Acid rinse	Cold	¾ min.
Nickel	150°	5 min.
Cyanide caustic neutralizer	110°	¾ min.
Soda ash-borax neutralizer	190°	¾ min.

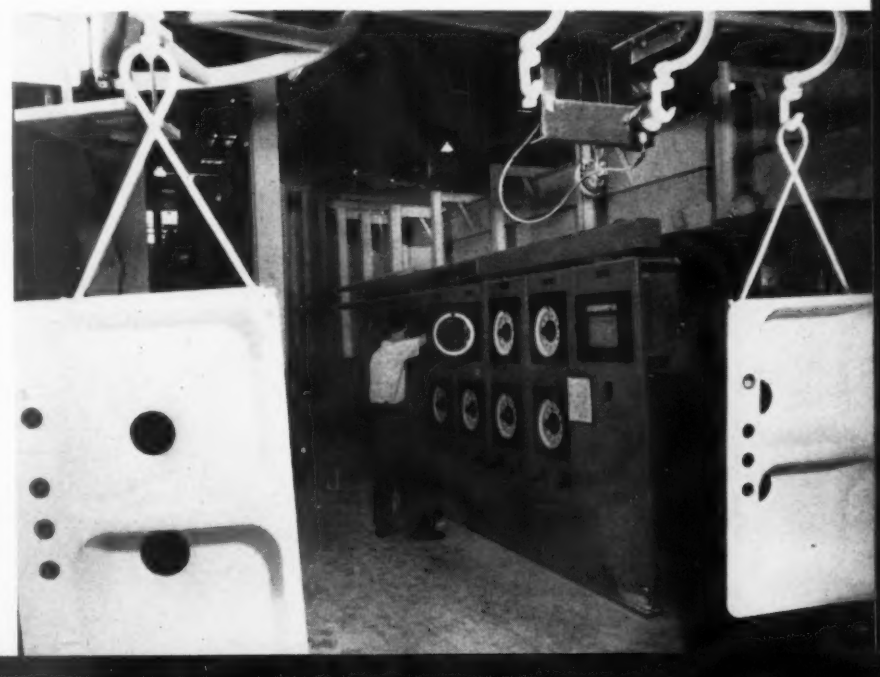
Recording thermometer controllers insure correct temperatures on all sprays, except the sulphuric acid which is controlled by a potentiometer controller.

The pickler is 147′-6″ long and is designed to operate with an outside monorail conveyor which carries the work through the machine. A seal extending the entire length of the pickler roof retains steam and fumes inside the unit. This seal consists of a water-filled trough and baffle through which offset conveyor hooks travel.

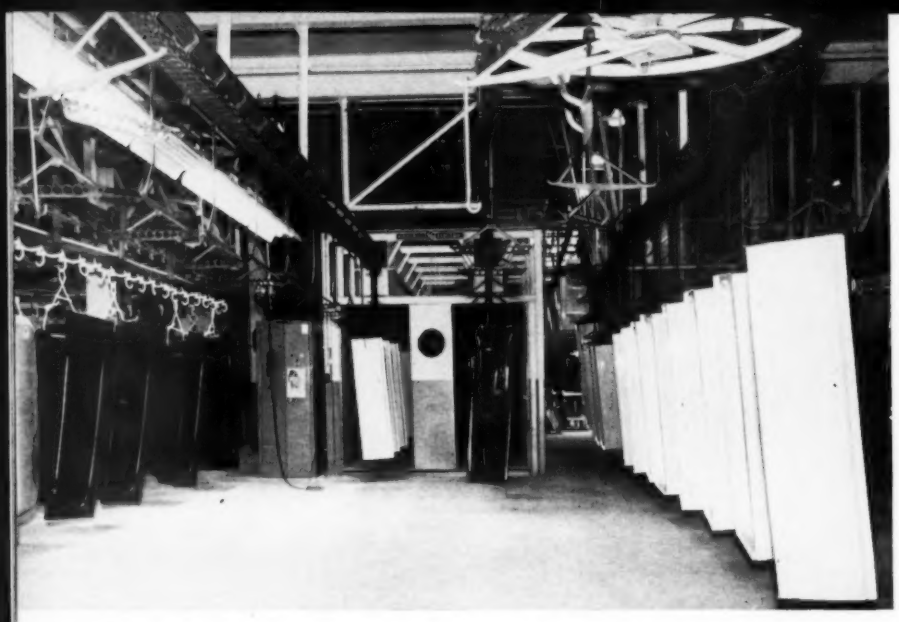
The housings and tanks for each stage are constructed of mild steel, except for the nickel sulphate which is made of Monel metal. The sulphuric acid and water rinse sections are rubber-lined.

All heated tanks use jet tank heaters, except the sulphuric acid and nickel sulphate stages which are heated by steam from a gas-fired steam boiler having a capacity of 3600 lbs. of steam per hour at 15 psi.

Ventilation for the pickling machine is provided. The ends of the machine are equipped with fan exhausts and stacks through the roof to prevent vapors from escaping into the enameling plant. The sulphuric acid stage has an independent rubber-lined exhaust with a stainless steel



Right: Control panel for cover coat firing furnace showing indicating controllers and strip chart recorders.



Left: One of the two new U-type, hump enameling furnaces which have electric ribbon heaters.

fan. The water for scrubbing is taken from the alkali rinse tank, and, being slightly alkaline, neutralizes the acid fumes. The nickel sulphate and cyanide tanks are also independently ventilated.

A 130-square-foot filter unit for the nickel sulphate stage and a 45-square-foot filter for the caustic rinse stage continuously filter these solutions.

A hot blast dry-off oven encloses approximately 20 feet of the pickler conveyor. A direct-fired gas heater provides oven temperatures of 350° F., with temperature control provided by an indicating control thermometer. The heated air is directed at the work through slotted ducts. Air seals are provided at the entrance and exit.

From the drier chain the sinks and bathtubs are transferred to the first spray line conveyor to receive the enamel ground coat. All enamel is applied by the spray method. The blue ground coat is sprayed on the ware in a 40-foot pressurized water-wash type spray booth where five sprayers work simultaneously. From an air supply room, air is furnished to this booth at the rate of 60,000 cfm and exhausted at 56,000 cfm.

A rigid inspection standard holds thickness of ground coat to between .005″ and .007″ dry.

Both the first cover coat and the acid-resisting cover coat spray booths are similar to the ground coat booth except that they are only 30 feet long. These booths receive conditioned air at the rate of 46,000 cfm and exhaust at 42,000 cfm.

Gas-fired drying ovens are located 3 feet from the discharge end of each spray booth. Oven temperatures are maintained at 350° F. Filtered make-up air is introduced into the ovens through damper-regulated intakes. Air seal fans and ducts at each end minimize loss of heat. An exhaust fan produces a counterflow of air in the oven, removing about 4000 cfm of air to maintain drying atmosphere.

From the drier conveyors, the ware is then transferred to the enameling furnace conveyor lines.

Enameling furnaces have zone control and seal-off doors

Both ground and cover coat enameling furnaces are U-type, hump furnaces with electric ribbon heaters. The former furnace, with a 40-foot firing zone, has eight zones of control; the latter has a 64-foot firing zone with 14 zones of control. All controls are indicating controllers, while multi-record strip chart recorders provide continuous records for quality control purposes.

The cover coat furnace with its 64-foot firing zone is the largest electric counterflow furnace in existence. Provisions have been made in both furnaces for increasing the length of the firing zones by 12 and 24 feet respectively. Firing zones may be sealed off by brick doors to allow maintenance in other sections without long cooling-off periods.

Following firing of the enamel, the ware is conveyed to the inspection line where it is carefully examined under fluorescent lights for the slightest flaws. The tiniest pinpoints are circled in red and the piece rejected. Rejected parts are carried on by the conveyor, re-sprayed, and re-fired. Ok'd ware is removed from the conveyor, crated and moved to waiting railroad cars and trucks.

Mill room uses conditioned water

The enamel for spraying is prepared in a mill room where every precaution is taken to obtain a uniform and uncontaminated milled

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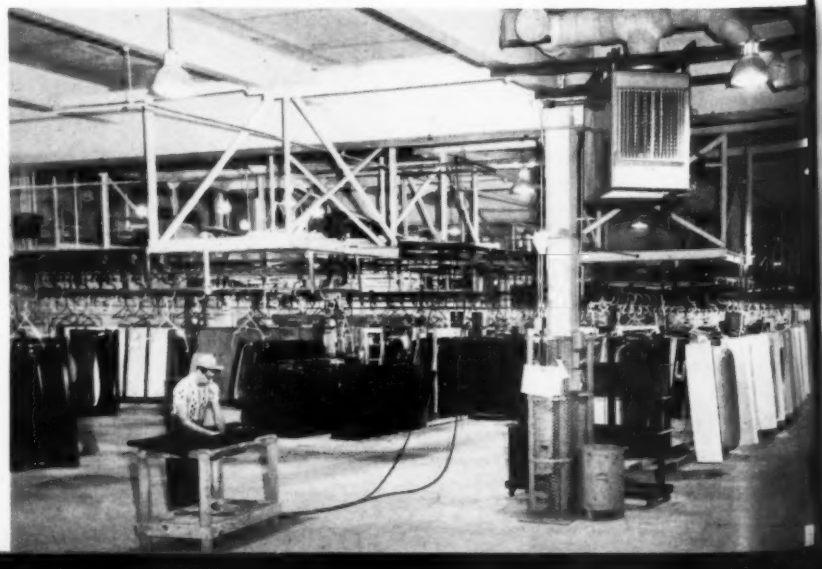


Right: Showing a section of the working area in Kaiser Metal Products' new enameling plant.

Simplified plant layout control

a proven defense plant "tool"—layout control for every equipment item in 1,500,000 sq. ft. plant area is handled by two men—a usable plan for any manufacturing plant

by Gilbert C. Close • FINISH CORRESPONDENT

IN the huge plant occupied by the El Segundo Division of Douglas Aircraft Company, the nation's largest facility devoted entirely to the production of Naval military airplanes, two men control the arrangement and physical layout of every piece of equipment ranging from small file cabinets to 5000-ton hydropresses on the production line.

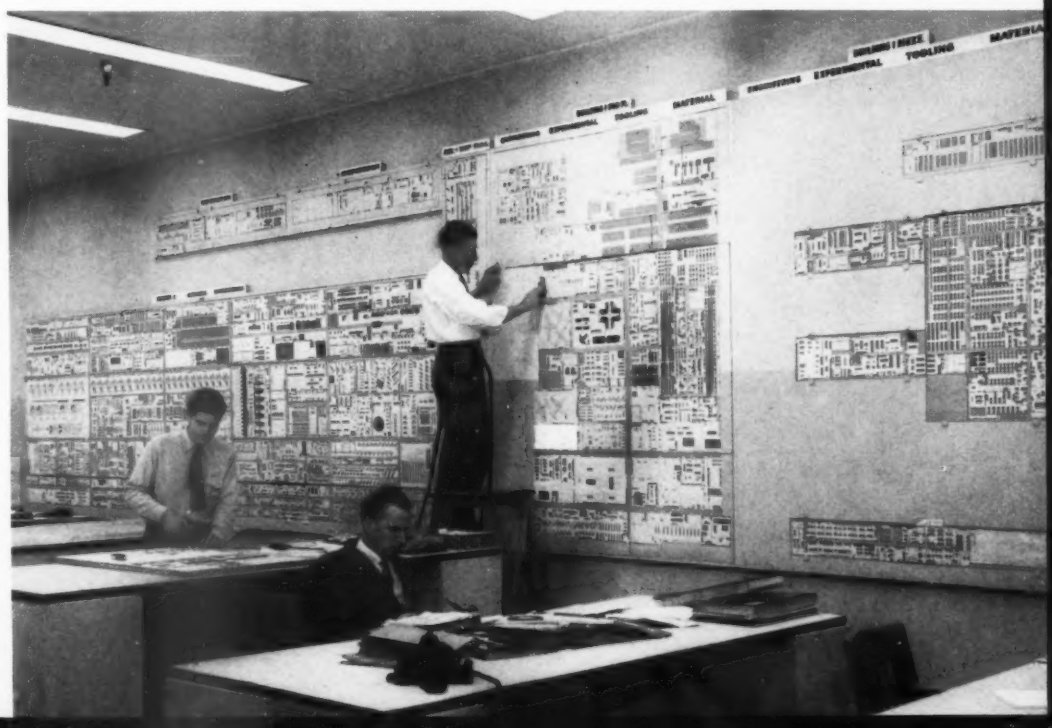
In all, the Douglas plant covers some 154 acres of territory. The one and one-half million square feet of building area houses some seventeen million dollars worth of production equipment. Like all military aircraft establishments, the company is beset with extreme fluctuations in production requirements, ranging in a period of months from pilot-line operations to all-out war production. Yet plant layout is never a problem.

It is not necessary to go out into the factory to see where a certain machine or worktable is located. Both the machine and the work table are represented by a scaled paper template on the master layout panel mounted on the wall in the plant engineer's office. Furthermore, the distance of each from other pieces of equipment, the open space around them, and the possibility of re-arrangement to include other equipment in the same area or provide a better work flow, is evident at a glance.

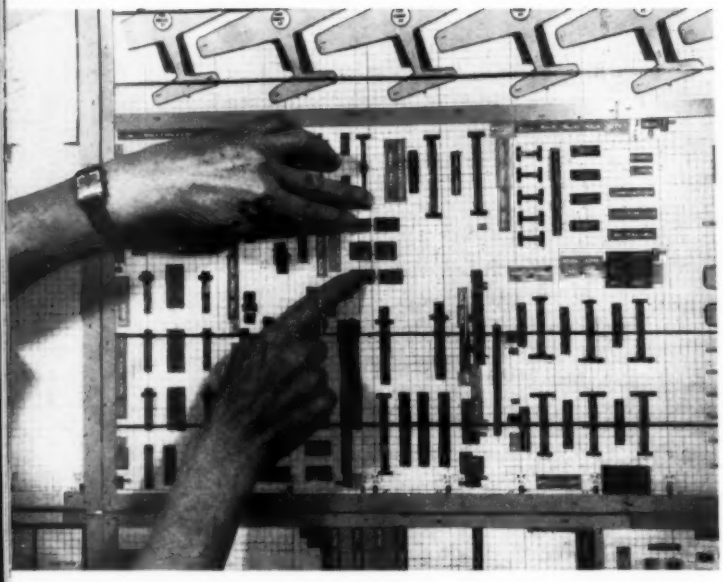
Basically, the entire system centers around this master layout panel. When a change is contemplated in plant layout or arrangement, whether the change involves a single drill press or re-routing of the entire production line, the change is made on the master layout panel before it is made in the shop. In fact, a photograph of the change as it is made on the master panel is used by plant engineering personnel as a blueprint in making the required layout alterations.

System saves 8,000 man-hours per year in layout work alone

This system was developed under the direction of R. A. Myers, plant engineer, and is now operated by J. K. Wilson, in charge of plant layout. Its efficiency is denoted by the fact that prior to its use, four draftsmen were constantly employed in making layout drawings. Wilson estimates that use of the master layout panel saves more than 8000 man-hours each year in layout only. The man-hours saved by the system's ability



General view of master plant layout panel as mounted on wall of plant engineer's office. J. K. Wilson, in charge of plant layout, is shown mounting a panel segment with its new layout. Man at left is stapling templates to another panel segment.



Close-up of a panel segment showing equipment templates in place. Each template is lettered to show the equipment it represents. Classes of equipment are shown by different colors.

to produce simplified blueprints for use by maintenance personnel cannot be estimated. Value of the system is better illustrated by the fact that it is receiving close attention and study by other industrial engineers from all over the country.

The master layout panel, made to a ⅛-inch scale, consists of the floor plans of the several plant buildings mounted on a number of wood panels. These panels are of a convenient size for handling during photographic reproduction (approximately two feet square.) Each of these panel sections with its portion of the base drawing, when mounted in the master panel, represents a segment of the building of which the base drawing is a part. Final layout of the master panel is such that the buildings are represented in their relative locations. Thus the master panel closely approximates a plot-plan of the total plant area.

Blueprints are automatically dimensioned

Blue-line prints, called "base-drawings," are reproduced from cloth tracings of the floor plans of the various buildings. These floor plans show all permanent plant obstructions such as partitions, walls and pillars, and note the location of vents, outlets, and emergency provisions that must remain unobstructed. Based on the ⅛-inch scale, these prints are divided into two-foot-square cross sections. This cross-sectioning of the base drawings is a major advantage of the system. Subsequent photographically reproduced blueprints for shop use are thus already visibly dimensioned, and there is no need for the actual measurement of floor spaces and transcription of these dimensions to the shop print.

Paper templates of ⅛-inch scale are mounted on the base drawing and used to represent all shop equipment. Different classes of equipment are represented by different colors. Standard templates already printed in strip form are used for standard equipment such as desks, tables, benches, racks, etc., while the templates for machines, jig, fixtures, and other special equipment that cannot be standardized in size are cut by hand to the same scale. When one of these templates is superimposed on the base drawing, the actual space it occupies is shown as well as its distance from other equipment. By using templates of different colors for different classes of equipment, these classes are still discernible as different shades of gray when the layout is reproduced photographically.

In making or re-arranging a layout, the blueline print base drawing representing the section of the plant area affected is stapled to the proper master layout panel segment. A "Hansen" stapling machine and 3/16-inch bronze staples are used for this. The proper templates are then assembled on the base drawing, tentatively arranged, and pinned down with map tacks. After study, discussion of the new layout by all parties concerned, including representative from the affected shop area, the templates are permanently stapled in place. This layout is then photographed full-scale, and the resulting negative used to produce blueprints for all parties interested in the new arrangement. Then the master layout panel segment with its base drawing and approved template arrangement is replaced in the master panel on the wall.

As experience was gained with this system, it was discovered that the easily reproduceable blueprint "pictures" could serve other essential functions. Aside from providing guidance to plant engineering personnel in making the new arrangements, they serve as a visual guide to departmental locations and functions. They are used in the identification of work flow lines for parts, assemblies and finished airplanes, and for the location of assemblies and airplanes in different departments. They are used also by the estimating and scheduling departments in charting the progress of various models.

Dimensional errors reduced

But their greatest value accrues to personnel engaged in actual plant rearrangement. These workmen have before them a complete "picture" of the department or area as it will look after the work is accomplished. The amount of space the equipment will cover and the space between installations is clearly shown by the scaled two-foot squares. The numerous dimensional "call outs" that clutter and confuse the average hand-drawn blueprint are entirely missing. It has been noted that fewer dimensional errors have been made than with the former blueprint system.

To supplement the simplicity provided by the master layout panel system, paper work in conjunction with a layout change has been reduced to a minimum. Any respon-

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Three-coat paint system for coastal regions

new mica-base paint system doubles life of distribution transformer tanks

by J. G. Ford AND *A. J. Kuli* • MANUFACTURING ENGINEERS, TRANSFORMER DIVISION, WESTINGHOUSE ELECTRIC CORPORATION, SHARON, PA.

THE life of the finish on Westinghouse distribution transformers has been more than doubled by a three-coat paint system which has been given the name, "Coastal Finish". Each coat functions cooperatively with the others to withstand the oxygen, acids, salts, and alkalis found in seacoast and industrial atmospheres. This three-coat system is applied in the same manner as standard finishes and in production it is baked on for speed. A modification of this finish air dries which means that it can be used to patch a transformer in the field should the surfaces be damaged.

Distribution transformers operate under especially severe conditions that affect the finish applied to the outside of the tank and associated hardware. The surfaces of fully loaded transformers exposed to direct sunlight often reach temperatures of 200° F. and sometimes higher. During the winter months these surfaces may be exposed to temperatures as low as –50° F. With an operating range of 250° F. the paint must be sufficiently flexible so as not to flake off due to differential expansion and contraction between paint and metal.

Elevated temperatures and oxygen of the atmosphere also cause the paint films to age and become brittle. This accelerates the tendency to flake or craze during the winter months. It is important, therefore, not only to select a finishing material from the standpoint of initial flexibility but for heat resistance as well.

Moisture in liquid or vapor form is perhaps the greatest enemy to the finish on distribution transformers in ratings commonly hung on poles. If it were not for moisture, the finishing of pole type transformers would present no serious problem except in rare cases. Oxygen, salts, acids, and alkalis present in the seacoast and industrial atmospheres usually are destructive as they deteriorate the film and pave the way for moisture to do its damage. Also, the effects of certain impurities accelerate corrosion by moisture once it gets to the metal.

Three-coat coastal system

The individual coats of the new three-coat system act cooperatively to resist penetration and also the elements that promote it. Proper preparation of the metal surface is necessary before the finish is applied. Good

First and second coats of three-coat finishing system are baked in infrared oven. Transformer tanks, shown emerging from oven on monorail conveyor, are ready for the second coat.

The first or priming coat is applied by flow-coating.

adhesion is generally obtained by removing all rust, scale, grease or other extraneous material. Ideal surfaces are obtained by treatment with phosphate solutions to form iron phosphate at the surface. The phosphate film retards corrosion by the passivating effect and offers a tightly adhering porous surface for the base coat of paint to penetrate and grip mechanically.

The prime or first coat applied to the prepared surface is composed of a vehicle giving good adhesion with desired flexibility and chemical resistance to salts, acids, and alkalis. The pigments used are primarily zinc chromate and iron oxide. Zinc chromate is perhaps one of the best corrosion inhibiting pigments due to the availability of the chromate iron in the presence of moisture. However, if used as a single pigment, it usually produces a film that is some what brittle. When combined with iron oxide, the brittleness of the film is reduced and the vat or storage life of the paint is increased.

The second or intermediate coat is without doubt the key to the successful performance of Coastal Finish. The vehicle is composed of modified phenolic and alkyd resins. These are chosen for resistance to heat, oxygen, salts, acids, and alkalis in concentrations generally encountered in the atmosphere. The resin is of the thermoset type. By proper selection of solvent and adjustment of setting time of the resin, it is possible to remove the solvent completely during the initial part of the drying cycle before the resin has set to the hard state. This permits the resin to flow after solvent elimination and prevents pinholes through which oxygen and moisture could enter.

The pigment is composed of selected mica flakes which overlap each other in the film and produce a "shingle roof" effect to further ward off moisture and oxygen. The mica also increases heat stability of the intermediate coat as much as ten times at elevated temperatures. Relatively large mica flakes plus their tendency to settle presented problems of application but these have been overcome.

The third and final coat is composed of resins and pigments to withstand the elements and to provide good appearance when new and after weathering has taken place. It can be tinted to give any desired color. When chalking takes place, a slightly darker shade develops which does not detract from the appearance of the transformer.

The final coat has several functions:

(1) It adds to appearance.

(2) It enhances the resistance of the other two coats to oxygen, moisture, etc.

(3) It screens out the ultraviolet light of the sun's rays.

Methods of application

The metal surface is first alkali cleaned and rinsed, followed by phosphatizing and a dip in dilute chromic acid. This results in a very clean surface light gray in color and of sufficient porosity for good paint penetration with maximum adhesion. To prevent any contamination of the prepared surface the transformer tanks are given the first or priming coat within a matter of hours by flow coating. Viscosity and gravity are controlled. The flow-coating process is used for priming to fill any crevices left between tank wall and projection welded parts. It also assures complete and uniform coverage of all parts. The tank then is conveyed by monorail through an infra-red dryer. A surface temperature of approximately 340° F. is reached by the time the tank leaves the oven.

After cooling, the second coat is sprayed on. A dark green dye is incorporated into the otherwise clear mica-base paint or enamel to assist the operator in determining coverage and to allow for easy and quick in-

After 2000 hours of exposure to salt spray a large area of the standard finish on the panel to the left was gone and corrosion was apparent while the mica-base finish on the panel to the right showed no corrosion.

spection. The dye fades out leaving a dark-brown color on subsequent infra-red baking which is done in the same type oven and at the same temperatures as for the first coat. The film dries to make a hard, tough, abrasion-resisting coating.

Not until the transformer is completely assembled and tested is the third and final dark-gray coat applied. The transformer is then conveyed through a steam convection oven operating at 160° F. where the final coat is dried tack-free. Hardening of the film takes place in storage and shipment.

Salt spray resistance test

The salt spray test is made in standard equipment using a 20 per cent solution of sodium chloride at 90° F. with 15 pounds pressure on the spray head.

Confirmation of the improved salt spray resistance of mica-base finish over the standard finish is illustrated by the photograph showing test panels. After 2000 hours under the salt spray, a large area of the paint was gone in the case of the standard finish (on the left) and corrosion was quite apparent, whereas with the mica-base finish there is no indication of corrosion.

One rather interesting result was the severe action of the salt spray on galvanized parts. This was indicated by the white deposits on the hardware. As a result it was considered desirable to test the mica-base finish on hanger irons for distribution transformers where standards are now for galvanizing. Test samples included galvanized; cadmium plated; galvanized and Bonderized; cadmium plated and Bonderized; galvanized plus mica-base finish; cadmium plated plus mica-base finish; galvanized and Bonderized plus mica-base finish; and cadmium plated and Bonderized plus mica-base finish. After 2000 hours exposure to the salt spray it was found that the zinc had been completely consumed on the galvanized hanger irons with iron rust spots showing through the white deposits of zinc salts. The cadmium-plated irons showed fairly good resistance to salt spray but small areas were attacked. The iron was not corroded. The galvanized and Bonderized and the cadmium-plated and Bonderized iron showed up extremely well. The galvanized and painted and cadmium-plated and painted irons showed extremely good resistance to salt spray with practically no indications of attack. Of all the combinations tested, the cadmimum-plated and Bonderized plus mica-base finish irons showed absolutely no signs of attack after 2000 hours.

Use of hanger irons

For these tests, ordinary production hanger irons were used. It is realized that the salt spray is a grossly accelerated test and that galvanized or cadmium-plated parts stand up well in marine and most industrial atmospheres. However, it is felt that the Bonderizing plus mica-base finish greatly enhances the protection already given by the electropositive metal.

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The second or mica-base coat is applied by spraying.

New laboratory for durability studies of protective coatings

A SPECIAL laboratory, recently designed and constructed by the Building Technology Division of the National Bureau of Standards, eliminates the major difficulties that have in the past led to anomalous results in the accelerated durability testing of exterior covering materials, a NBS report states. Developed primarily for studying organic coating materials such as paints, asphalts, and tars, the new facilities are said to be sufficiently flexible to meet the requirements of most materials exposed to weathering.

Materials intended for outdoor use are frequently exposed in the laboratory to regular cycles of artificial sun light, heat, and water for the purpose of hastening their deterioration. Although such exposure—called accelerated weathering—is generally accepted as a means for determining the relative resistance of similar materials to weathering, results obtained by different laboratories, and even by the same laboratory, do not always show good agreement. This lack of correlation results from variables inherent in the testing procedures that have in the past been largely uncontrolled. These include solids content of the water supply, fluctuations in the light intensity, and irregular operation of the system due to failure of one or more functions while the others continue to operate.

An automatically controlled weathering laboratory

Automatic control of all functions, and of the temperature and purity of the water within narrow limits, assures uniform operation at all times of the Bureau's improved accelerated weathering laboratory. The room, 16 by 25 feet in size, is maintained within ± 1°C. of any desired working temperature, at present, 27°C. The relative humidity is not controlled directly, but remains in the range of 40% to 60% as a result of the subcooling of fresh air brought into the room. The floor area is divided into three portions: a central working space and two areas enclosed in hoods to house the testing machines.

In one hood are six machines built at the Bureau to utilize the enclosed carbon arc as a source of light. The operating range of each light is regulated at 130 to 145 volts and 15 to 17 amperes by means of chromel C ballast resistors in series with the arc. An aluminum drum 31 inches in diameter and holding sixty exposure panels (2¾ by 6 inches) is rotated around each arc at a rate of one revolution per minute. Air at ambient conditions is circulated around the panels at a low velocity until they reach a predetermined maximum temperature. At this time a thermosensitive element mounted in one of the panels turns on the high speed blower, which materially increases the air flow and thereby reduces the panel temperatures. Deionized water, controlled by a cycle clock, can be sprayed on the test panels for any portion of their exposure period.

The heart of each machine is a time-delay relay which turns off all functions of that machine if the arc should cease to operate for a period in excess of 30 seconds. Voltage and current are continuously indicated while the running time and power consumed by the arc are recorded by suitable instruments on each machine. Wiring circuits have been designed to take advantage of the 2% voltage control supplied the Bureau.

The other hood encloses a modified commercial open-drum Atlas Weather-ometer, two twin-arc Weatherometers, and an Everready X-1A machine. These are controlled in a manner similar to that of the other machines.

Air and water "conditioning"

An air conditioner of tremendous size could be required to control the temperature of the space around all 10 machines, which dissipate 39 KVA of energy. This temperature is therefore regulated by blending various amounts of outside corridor air (ranging from 15° to 35°C.) with conditioned air at 25° ± 1°C. The resultant mixture is distributed to the machines in each hood by a 2000 cfm blower with a proportioning damper in its intake plenum. The blended air is distributed in turn to the vicinity

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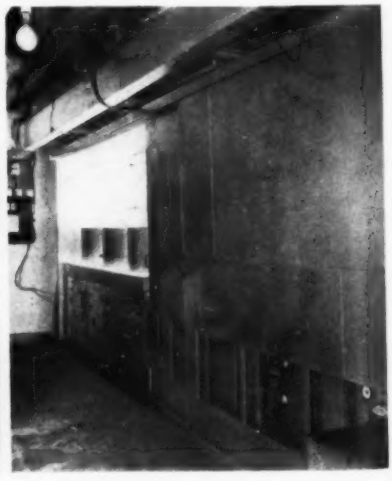
Over-all view of new NBS laboratory for accelerated durability testing of exterior coating materials. In the hood at right are six weathering machines built at the Bureau and based on the enclosed carbon arc as a source of light. The hood on the left encloses four modified commercial weatherometers. The water-conditioning equipment is located above the machines on the right and the air conditioner in in the background, center. Automatic control of all functions and conditions within narrow limits will permit the Bureau to obtain more reliable, accelerated weathering performance data on materials intended for outdoor use.



Low pressure spraying of porcelain enamel

outlining the advantages, the material characteristics, and the equipment used to secure savings in excess of $50,000 for a single year

by R. S. Sheldon • FRIGIDAIRE DIVISION, GENERAL MOTORS CORP., DAYTON, OHIO

LOW pressure spraying is not a new technique. The organic finishes have utilized low atomizing pressures for years with very good results. The use of low pressures for the spraying of porcelain enamels has been practiced in this industry for about fifteen years. The success of the practice prior to the last war was limited by a lack of understanding of the factors involved as well as by the equipment and materials available. As the characteristics of the porcelain slips approached those of the organic materials and as spray equipment was improved, low pressure spraying began to find increasing favor and success in porcelain enameling. The advent of titanium cover coats with finer grinding, lower application weights, requiring uniform application, gave an added impetus to the use of lower pressures.

The purpose of this article will be to present the experiences and results of the "low pressure" program at Frigidaire, reviewing these in relation to the factors involved in the practice.

Low pressure spraying as referred to in this article will mean an atomization pressure at the spray gun of 60 pounds or less.

Literature

Although published information on this subject is very limited, a brief review of the literature is included for background purposes. In the early thirties Frank Porter made a thorough study of spraying in connection with the one-coat white program at Edison GE[1]. His observations are still fundamentally being followed today in low pressure spraying namely: increase the gravity, reduce the set, lower the atomization pressure, and savings in material as well as improved quality will result. It must be remembered that this work was carried on prior to the super-opaque antimony enamels and with spray guns of limited flexibility.

During the Symposium on Spraying at the 1941 PEI Forum[2] there was considerable discussion of atomizing pressures. Low pressure had been tried by many with the results varying widely, but in general where the practice was undertaken with care and control, material savings up to 27% were reported.

The paper on Low Pressure Spraying presented by Marcel Pouilly *(Formerly American Stove Co.—now DeVilbiss Co.)* at the 1949 PEI Forum[3] is an excellent discussion of the factors involved in the practice as carried on today. This paper is recommended as a guide for those who are interested in setting up a program on low pressure spraying in their plant.

Four factors to be considered

The establishment of the practice of lower atomization pressures and the success of the program is dependent on a thorough understanding of the factors involved and the results which may be obtained. These are:

1. *Advantages*
2. *Personnel*
3. *Enamel Materials*
4. *Spray Equipment*

Advantages:

The discussion of advantages has been placed first since it will be necessary to sell management and obtain their support for such a program before it is initiated. This is not always an easy matter in any plant, but there has been sufficient industry-wide experience to establish these advantages for discussion purposes.

1. Material Savings
2. Improved Quality
3. Improved Control
4. Reduced Operator Fatigue
5. Reduced Operation Expense

We have effected a 33% savings in material on the food compartment liner through the change to low pressure spraying. Improvements in spray practices during 1950 alone, meant a savings in excess of $50,000. Ingersol Steel Division, Borg Warner Corp. reported a material savings of 30%, equivalent of $3,000 per month, as well as improved surface finish.

As our spray technique improved, enamel and assembly rejections were reduced. The surface finish is improved and we are able to maintain the enamel thickness in the range of lower application weights for good coverage and service.

We have found that enamel slips with low set characteristics are easier to control. The control of these physical characteristics is an important factor to the success of low pressure spraying. The changes in set are measured with more accuracy and the set is adjusted more easily. Lower set permits the wetting out of the enamel and enables the sprayer to apply the proper weight of coating in the normal time. Excessive application immediately causes the sprayed enamel to sag or run. We have been able to reduce the weight of equipment in the sprayer's hand by 15 ounces through changes in spray gun, hose, and hose connections. This weight reduction has been a definite factor in making the

spray operation less tiring to the sprayer.

With proper spray technique, waste motion and waste energy are eliminated. Thus the operation is less tiring to the sprayer, for by spraying with steady uniform strokes the proper coating is obtained in less time with less effort.

Naturally with less overspray there will be less booth dust to handle. As one plant operator expressed it, "We used to haul the overspray away by the truckloads, now we take it out in a wheelbarrow." Lower atomizing pressures mean a reduction in air and power consumption. In our porcelain department this reduction is equivalent to one-third the capacity of a 3200 cfm low-pressure compressor driven by a 600 hp motor. The resultant lower fluid pressures mean a longer tip and needle life.

Personnel

1. *Supervision*
   a. *Education*
   b. *Functions*
2. *Spray Operators*
   a. *Training*
   b. *Control*

We have observed that competent and adequate supervision is a most important requisite in spraying. These people must be completely sold on the practice of low pressure spraying and be thoroughly familiar with the techniques involved. In the beginning, our program met with some resistance as there was a lack of clear understanding of the principle factors. It was with some difficulty that we were able to convince everyone of the advantages of the practice. As knowledge and experience increased, the attitudes changed and the program was undertaken with enthusiasm.

The training and selling the low pressure technique to the sprayers is usually the duty of our foreman and group leaders. We find that the job of selling to the operator can best be accomplished by simple explanation of the advantages to the sprayer and with a personal demonstration of the proper spray technique. On occasion a demonstration and explanation by one of the supplier service men has been of value.

The changing of the atomization pressure to 50-60 pounds, holding the gun within 8-10 inches of the work surface and spraying in steady uniform strokes has required schooling of the operator. Most of our sprayers are old-timers and some did not change readily, did not fully understand the reasons for change, but with patience and encouragement we did obtain some highly satisfactory results.

We recognize that it is the natural tendency for the sprayer to drift back into old habits and we try to check this drift before it goes out of bounds. Since the adoption of "low pressure", it has been found advantageous to maintain constant control over the operations from mill room to spray booth. At the outset it may appear that this requires more effort, but once the controls are established they are easier to maintain.

While the human element is the most important factor in spraying, it is too often permitted to be the weakest link in the program. We should all be constantly striving to strengthen it. When this is accomplished we will be in a position to demand and receive additional improvements in materials and equipment. In turn we will be better able to meet the keen competition of the organic finishes.

Table 1
Food Compartment Liner-Cover Coat

	Jan. 47	May 47	1949	1950
Enamel	Zirconium	Zirconium	Titanium	Titanium
Sp. Gr.	1.80	1.88	1.68	1.72
Pick-up	200 Gr.	60 Gr.	90 Gr.	55 Gr.
Air Press.	90#	60#	60#	50#
Fineness	5%	3%	½ %	1%
Savings	—	25%	—	8%

Table 2
Exterior—Cover Coat

	1948	1949	1950
Enamel	Zirconium	Titanium	Titanium
Sp. Gr.	1.80	1.62	1.72
Pick-up	200 Gm.	90 Gm.	55 Gm.
Air Press.	90#	65#	55#
Fineness	5%	½ %	1%
Savings	—	—	23%

Table 3
Automatic—Cover Coat

Enamel	Zirconium	Titanium
Sp. Gr.	1.82	1.74
Pick-up	200 Gm.	40 Gm.
Air Press.	125#	60#
Fineness	5%	1%
Savings	—	20%

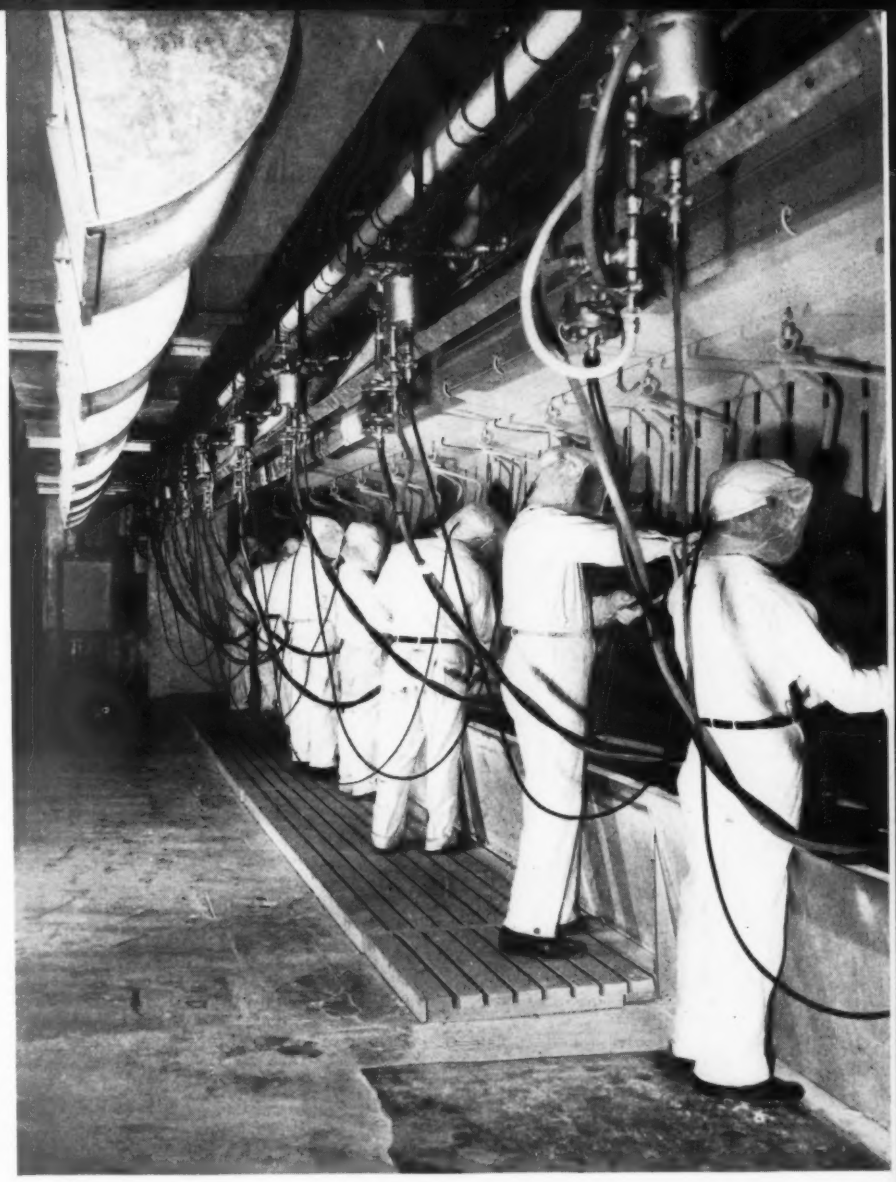
Table 4
Exterior—Ground Coat

Enamel	Dip Gr. Ct	Spray Gr. Ct
Sp. Gr.	1.63	1.68
Pick-up	—	90 Gm.
Air Press.	65#	50#
Fineness	6%	4%
Savings	—	10% Approx.

Enamel Materials

1. *Type of Frit*
2. *Mill Additions*
3. *Control*
   a. *Specific Gravity*
   b. *Enamel Set*

About four years ago with the cooperation of one of our frit suppliers, we embarked upon the program of low pressure spraying of cover coat on food compartment liners. At the time we were using zirconium enamels, with a specific gravity of 1.80 and a pick-up of 200 grams wet per 2 sq. ft., and an atomizing pressure of 90 pounds. It must be admitted that the finish was



Spraying liners in the Frigidaire plant. Milled enamel is fed to spray booth through tube system from air-conditioned milled enamel storage room. Spray foreman adjusts pressure by remote control on supply pressure tanks in storage room.

rough, enamel thickness on the heavy side, with overspray and blow-back a problem. Our original intention was to make gradual adjustments in the mill additions to obtain the desired specific gravity and set changes but when the time came to run the trial we threw caution out the window, much to the consternation of the frit service men, and went all the way in changes. Almost overnight the specific gravity was raised to 1.88, the pick-up lowered to 60 grams, and the air pressure dropped to 60 pounds. The changes in surface finish, overspray, and sprayer attitude were immediately apparent. In addition, the change to low pressure spraying brought out a difference in opacity development between the two zirconium frits in use. The laboratory tests had shown the difference, but due to the spray conditions on the line, it did not become apparent in production.

The foregoing practice was continued until titanium enamels were introduced on the line. In the beginning the titanium cover coats were used with a specific gravity of 1.68, a pick-up of 90 grams, and an air pressure of 60 pounds. Again with the cooperation of the material suppliers the problem was studied and changes this time were made in a more leisurely and gradual manner. The specific gravity of the enamel was raised to 1.72, the pick-up lowered to 55 grams and the air pressure dropped to 50 pounds. The improvements in quality and spray conditions were gratifying.

In establishing "low pressure" on the spray line we have found that it is necessary to adjust the specific gravity and set according to the design of ware, production rate, enamel thickness and type of frit on the particular spray line. The changes made on the spray lines other than food compartment, will be discussed later.

It has been observed that the best coverage can be obtained with a slip of minimum water content, consistent with good atomization at the spray gun. Before making adjustments in mill additions to obtain the desired slip conditions it is suggested that the frit company be consulted for recommendations as they are familiar with the physical characteristics of their material. At present we are considering further changes in mill additions, such as clay, in order to further increase the gravity and lower air pressures. In cooperation with the suppliers, clay changes will have to be carefully studied as to their effects on the color characteristics and acid resistance of the titanium frits.

Experience has indicated that high specific gravity and low set is the best combination for low atomization pressures. It is highly essential that the testing and control of these physical characteristics be done with care in order to maintain uniform spray conditions from day to day. The methods of determining specific gravity are standard but the methods of measuring "set" are as varied as there are operators in enamel plants. We obtain good control of specific gravity using a metal cylinder of 100 cc volume and a vented cap to eliminate the reading of a miniscus. The "set" is measured as wet weight pick-up on an enameled cylinder of 18 inches circumference and 8 inches high. This method is somewhat crude and requires care on the part of the operator but it has proven fairly satisfactory to date. We are

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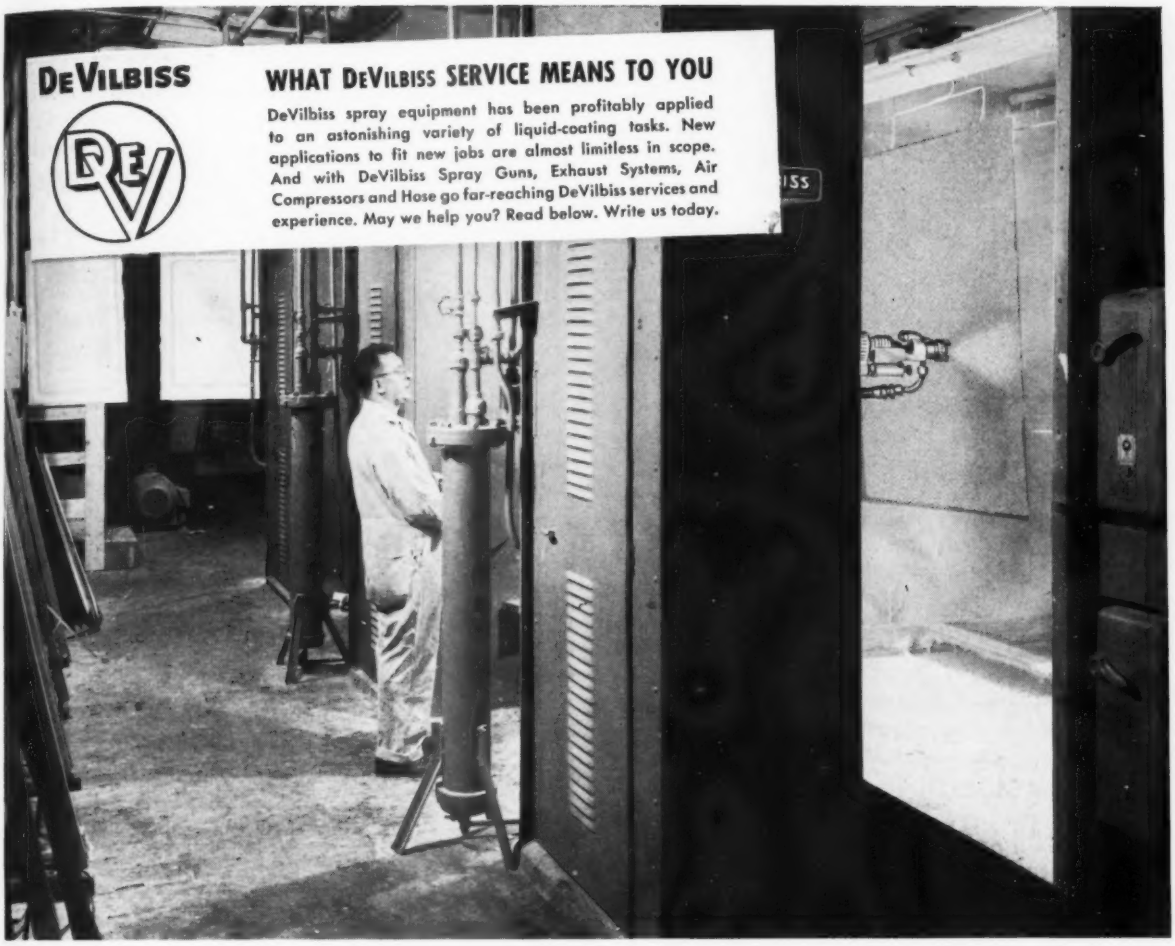
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THE SPRAY THAT'S RIGHT ON THE BEAM

Plastic table tops are coming through the DeVilbiss spray booth you see pictured above.

And the sales appeal these table tops have at the retail level is due partly to the gleaming finish they get here.

This particular machine is one of 5 vertical transverse units built for spraying plastic panels on 48" centers and traveling 15 to 20 feet per minute.

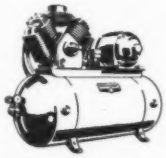
Each transverse machine is equipped with 4 automatic DeVilbiss Spray Guns traveling at 288' per minute. They spray primer on backs; primer, mist-color and wet-color on fronts.

The neat part is that all the guns are controlled by light beam and operate only when there is work at the spray station.

Improved finishing technique, like this, is typical of DeVilbiss service and products—Spray Equipment, Compressors, Spray Booths and Hose. To see how their application can be profitable to you, see your DeVilbiss branch office.

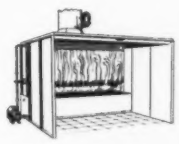
THE DEVILBISS COMPANY
Toledo, Ohio

Windsor, Ontario • London, England
Santa Clara, Calif.
Branch Offices in Principal Cities


Air Compressors

Hose and Connections

Spray Guns


Spray Booths

FOR BETTER SERVICE, BUY
DEVILBISS

RHEEM FORMS AIRCRAFT DEPT.

Rheem Manufacturing Company has formed an aircraft department to be headed by Laurence H. Cooper, it has been announced by W. E. Zander, senior vice president.

A 50-acre site near the Rheem plant at South Gate, California, has been purchased, and a contract has been let for a building specially detreating equipment, special aluminum signed to handle aircraft work, with a manufacturing area of more than 200,000 square feet.

During World War II, Rheem was extensively engaged in aircraft subcontract work for Lockheed, Consolidated-Vultee, Northrop, Bendix, Ryan and others. The company plans to reenter the same field and negotiations are now said to be in progress with several of the major aircraft companies.

$2.5 MILLION AVIATION PARTS CONTRACT TO FLORENCE STOVE

no interference with civilian products manufacture anticipated

Culminating negotiations over the past six months between Florence Stove Company, Gardner, Mass., and Republic Aviation Corporation, Farmingdale, N. Y., a new contract covering the manufacture of ailerons and wing flaps for F84 Thunderjet fighter planes has been reported by Robert H. Taylor, president of Florence. The company plans to manufacture these parts at its Gardner plant, and the initial order received calls for quantities valued in excess of $2,500,000.

According to Theodore E. Keller, vice president in charge of manufacturing at the Gardner plant, Florence will turn out these parts in mass production and will convert an area of some 45,000 square feet for this work in addition to production facilities of the main plant buildings. Work on these parts will feed through the various departments of the factory with the final assembling, crating, etc., being handled in a converted warehouse section.

New machinery and equipment involved will include salt-bath heat welding equipment, rolling equipment, riveting equipment, routing equipment, dimpling machines and anodyzing equipment.

According to present plans, work on this contract will be carried on in addition to the regular production scheduled for ranges and heaters, with no interference with the manufacture of Florence civilian products expected at this time.

BIRTMAN BUYS AMERICAN LAUNDRY MACHINE PLANT

Birtman Electric Company, Chicago manufacturer of domestic washing machines and other electrical products, is reported to have purchased an industrial building at 1300 N. Spaulding from American Laundry Machine Company for $400,000. The plant is a two, three and five-story structure containing some 160,000 square feet of floor space.

ZIRCONIUM FINDS NEW APPLICATIONS FOR DEFENSE

Modern jet engines presented difficult metallurgical problems involving strength, weight and corrosion resistance at elevated temperatures, but the development of atomic power plants has added yet one more factor to contribute to the metallurgists' troubles—the problem of neutron capture by the materials of construction used in an atomic reactor.

All of the usual metals with good strength, corrosion and high temperature character have a similar appetite for neutrons, and nuclear designers were forced to search for a new metal to help solve one of their many problems.

According to Foote Mineral Company, of Philadelphia, the metal zirconium is finding applications to help meet these problems. Zirconium has excellent properties of corrosion resistance, strength and weight, plus a relatively low tendency to capture neutrons. It has been found well adapted for use in atomic furnaces and other similar applications.

FEDERAL ENAMELING COMPLETES $1,000,000 IMPROVEMENTS

launches biggest advertising campaign in company's history

Behind the biggest advertising campaign in the history of Federal Enameling & Stamping Company (for 1951) is a five-year program of intensive research which has led to unparalleled technological advances in enameled kitchen utensils, according to J. J. Harding, president of the Pittsburgh, Pa., firm.

Harding said a newer, stronger, more durable product has resulted from several years in the laboratory. He also cited the work done at the University of Illinois under a fellowship established by the enameledware industry. Here, he said, the product was given added resistance to heat shock and food acids.

Titanium, described by Harding as the "miracle element," is one of the larger contributors to the quality of the new Federal enameledware, he said, adding that his company is now mass-producing titanium enam-

els. Harding pointed out that Federal has spent almost a million dollars in the last few years to make possible the production of quality enameled-ware on a volume basis.

54 PER CENT OF HOMES NEED MODERNIZATION

It is estimated that there are 42,000,000 homes in the United States. Of these, 23,000,000 (54%) are 30 years old or older. Most of these 30-year-old homes have kitchens, bathrooms, and heating equipment as old or nearly as old as the house.

Due to the fact that credit restrictions are expected to curtail the volume of new construction in 1951, the older dwellings will come in for an increasing amount of attention, the Plumbing and Heating Industries Bureau predicts.

VANCE NAMED MAYTAG SECRETARY

Robert E. Vance has been elected secretary of The Maytag Company, succeeding the late W. I. Sparks. Vance started to work for Maytag as a retail salesman in 1926. Since 1942 he has been assistant to Fred Maytag II, president of the company.

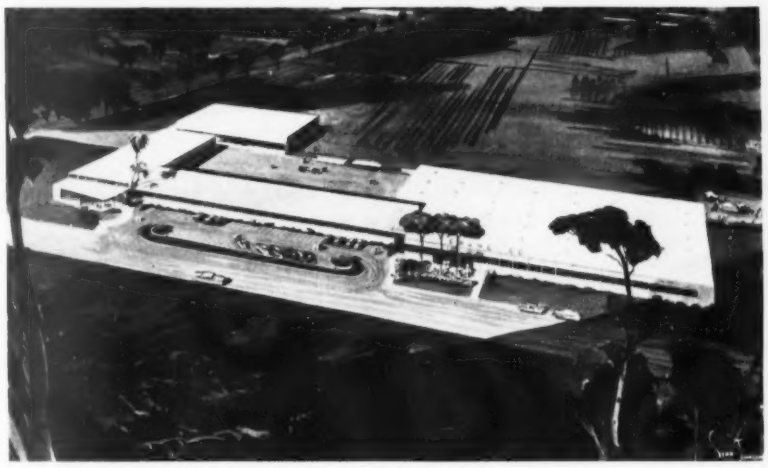
LINDEMANN & HOVERSON APPT.

Johnston P. Scott, who joined A. J. Lindemann & Hoverson Co. several months ago as sales manager, has been named a vice president of the company. He was previously with Universal Cooler Division of Newport Steel Corp. as sales director.

ARMCO EXPANSION PROJECT TO GET UNDERWAY SOON

J. S. Thomas, director of purchases, Armco Steel Corporation, has announced that contracts have been negotiated for a $35,000,000 blast furnace and coke ovens to be built in Middletown, Ohio. The huge construction project was announced last fall when the company started operation of its new $12,000,000 open hearth department. It was indicated that construction would start as soon as deliveries of steelwork and equipment can be made.

NEW WEST COAST PLANTS FOR CRANE AND ALLIANCE WARE



Two plants erected on adjacent sites at Colton, California, for The Crane Company and AllianceWare, Inc. are now said to be supplying plumbing ware for West Coast building industries. The Crane plant has a total of 150,000 square feet of floor space, with provisions for increasing the area by approximately 25 per cent. All manufacturing is handled in a mechanized straight-line production layout parallel to a railroad siding.

Manufacturing facilities in the AllianceWare plant is concentrated in a 26,000 square foot building which shares use of a railroad spur, with its shipping department directly opposite the Crane shipping platform to permit loading of cars from both sides at one time. Stampings for use in the production of AllianceWare bathtubs, lavatories and sinks are produced in the company's plant at Alliance, Ohio, and shipped to Colton for enameling.

MULLINS HAS $10,000,000 SHELL CONTRACT FROM ARMY

Fix to head new plant production — $300,000 rehabilitation program

C. L. Fix has been named works manager of Mullins Manufacturing Corporation's Liberty plant at War-

ren, Ohio, which will make shells for the Army, Frank M. Beauregard, vice president in charge of operations, has announced.

Fix joined the Mullins organization in May, 1950, as director of quality. Trained as a management engineer, he served his apprentice years with Chrysler Corporation, Detroit, and Western Electric Company, Chicago. He also served in engineering, personnel, and plant managing positions with David Bradley Mfg. Works, Illinois Iron & Bolt Co., 1900 Corporation (Whirlpool), K-D Lamp Division of Noma Electric Corporation, and Ingersoll Steel Division of Borg-Warner Corporation.

In his new position he will be in charge of production of mortar and artillery shells for which Mullins has two contracts totalling nearly $10,000,000. It is expected that about 700 persons will be employed when operations begin. Mullins is currently spending $300,000 to rehabilitate the Liberty plant, said the report.

NEW MONARCH MACHINE APPTS.

New Monarch Machine & Stamping Co., Des Moines, Iowa, has announced two appointments within the organization to executive positions. Lee A. Shelton was appointed general manager, and Arvid C. Anderson was named sales manager.

Other top executives in the company include Frank H. Anderson, president, and Clarence S. Anderson, vice president.

GIBSON RECEIVES CONTRACT FOR CARGO, TROOP PLANE PARTS

defense work not to interfere with civilian production

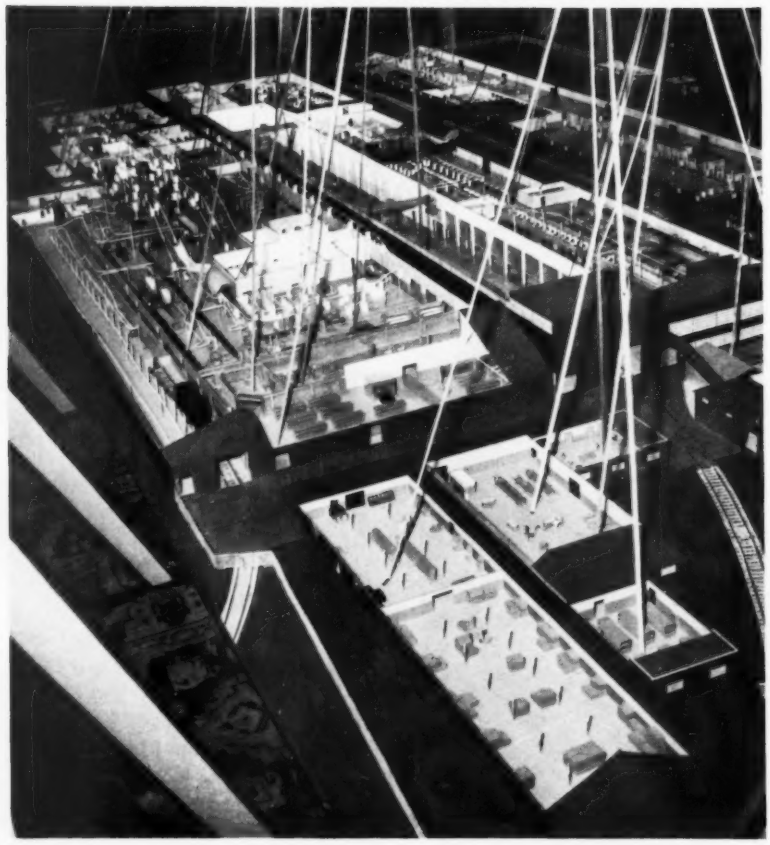
Gibson Refrigerator Co., Greenville, Michigan, is reported to have been awarded a sub-contract by Kaiser-Frazer Corp. for the building of control surfaces for C-119 cargo and troop-carrying planes.

Sections being built by Gibson include ailerons, rudders, stabilizers and some floor and tail components, it was stated. Kaiser-Frazer's contract is for an undisclosed number of planes.

The plane parts program will not interfere with civilian production, Charles J. Gibson, president, explained. The company will shift locations of some departments in the Belding and Greenville plants to accommodate the defense work.

Albert M. Gibson, vice president, will have charge of the program that necessitates new equipment and reassigning some of the company's personnel. Last fall he was appointed manager of the company's new war products division (October, 1950, *finish*).

MODEL OF ADMIRAL'S NEW $5 MILLION REFRIGERATOR PLANT



More than 1000 distributors and their salesmen who attended the recent national sales convention of Admiral Corporation saw this exact scale model of the company's new $5,000,000 refrigerator plant at Galesburg, Ill., which is now in operation. Ribbons in the photo lead to written descriptions of the operating units situated above the picture.

FLOYD-WELLS UPS FISHER

Announcement has been made by The Floyd-Wells Company, manufacturers of Bengal gas ranges, of the appointment of W. Frank Fisher to the position of executive vice president. In addition to his new duties, Fisher will continue to serve as general manager of the company, a post he has held since July of 1949.

MIDWEST ENAMELERS CLUB MEETING ON MARCH 3

The Midwest Enamelers Club will hold its 25th anniversary celebration at the LaSalle Hotel, Chicago, on Saturday, March 3, and not a week later as previously reported. F. A. Petersen, Club president, states that the Club is interested in having as many of the 18 "charter" members attend the meeting as possible.

GAS-FIRED CENTRAL HEATING UNIT SHIPMENTS AT NEW "PEAK"

Industry shipment of gas-fired central heating equipment (boilers, furnaces, and conversion burners) during 1950 surpassed 1,000,000 units and established a new "all-time peak." The industry's previous "peak" was established in 1946 when 662,500 units were shipped, according to Edward R. Martin, director of marketing and statistics, Gas Appliance Manufacturers Association.

Oil burner installations during 1950 totalled 817,700, or just under the 888,100 installations during 1927, previous "peak" year.

Gas-fired furnace shipments during 1950 totalled 589,200 units; gas-fired boilers 76,500 units; and gas conversion burners 338,600 units.

AMANA REFRIGERATION DOUBLES PLANT FACILITIES

George C. Foerstner, vice president and general manager, Amana Refrigeration, Inc., Amana, Iowa, has reported that although Amana now has a "new customer" in the Army

. . . serving you since '32

including the years of the Emergency, too

During the Last Emergency, we were vendors and consultants to many of the largest prime contractors producing material for the Army and Navy . . . Our products were concerned with aircraft frames, aircraft motors, guns and gun parts, bombs and bomb parts, small arms, ammunition, brass and steel shell cases, automotive and tank parts, radio and radar equipment, electrical equipment, Diesels, machine tools, screw machine products, wartime appliances and caskets.

Our products were used for cleaning and drawing of aluminum, magnesium, brass, copper, steel and zinc prior to plating, bonderizing, anodizing, zinc chromating, painting, spot welding, heat treating, blackening, vitreous enameling and stripping. The Northwest and Alkalume trade mark was a familiar sight in hundreds of plants throughout the country.

Today, as the country is tooling for many of these same products, we are just as ready to serve—NORTHWEST has kept pace and has anticipated industry's every need in our field . . . Our production facilities have more than doubled in the last five years and so has our technical staff.

Our business has grown spectacularly during the present era because it has made sense to a lot of you to have the same company supply the correct lubricant for drawing metal and provide the product or process for its removal afterward . . . *Let our technicians consult with you on your drawing and cleaning problems. You'll find it pays.*

and Navy, it is in a position to take care of new customers and distributors because their expansion program that is already under way doubles the present facilities of their plant. Foerstner made the statement at a January meeting of more than 130 company distributors.

PMI TECHNICAL MEETING IN CLEVELAND, MARCH 29-30

The Pressed Metal Institute has announced that its second annual spring technical meeting for the metal stamping industry will be held at Hotel Carter, Cleveland, Ohio, March 29 and 30.

Participants in the opening sessions on "Tolerances" and "Die Standards" will include some of the country's top men in the field. Included will be a report on die standards work done by such companies as Westinghouse and Fisher Body.

The second day's program will focus attention on new "Safety Hints" and the "Conversion to Stampings." The latter topic is especially important, it is pointed out, as in the next few months the stamping industry will be faced with the biggest military conversion job in history. Some interesting military applications will be discussed.

The registration fee of $7.50 per person will entitle each registrant to a bound copy of a stenotype report of the sessions which are open to PMI members, non-members and technical personnel of other industries.

Reservations should be addressed to the Pressed Metal Institute, 13210 Shaker Square, Cleveland 20, Ohio.

THREE TAPPAN PLANT EXECUTIVES PROMOTED

HOUSTON

LE MUNYON

HOWER

Three employees of The Tappan Stove Company have been promoted to new positions with the firm, it has been announced by W. R. Tappan, vice president and general manager.

J. S. LeMunyon, assistant plant superintendent, has been promoted to plant superintendent to fill the position formerly held by W. R. Mabee, who was promoted recently to vice president and assistant general mgr.

B. L. Hower, production manager, has been named assistant plant superintendent, and M. E. Houston, assistant production manager, becomes production manager.

Joining the company in 1918, LeMunyon has worked in almost every department in the plant. Hower, a Tappan employee for 24 years, has been production manager since 1939. Houston, a 14-year man with Tappan, was named assistant production manager in 1948.

HOME LAUNDRY EQUIPMENT SALES TOTALS—1950 VS. 1949

washers up 41.4%, dryers up 201.2%, ironers up 33.1%

Factory sales of standard-size household washers in 1950 totalled 4,289,931, or an increase of 41.4 per cent over 3,033,106 units in 1949, according to industry-wide figures announced by the American Home Laundry Manufacturers Association.

Dryers sold in the year aggregated 318,488 units, 201.2 per cent more than 105,727 in 1949. Sales of ironers totalled 409,200 compared to 307,345 in the preceding year, a gain of 33.1 per cent.

Washers sold in December amounted to 377,013 units, 58.7 per cent more than 237,591 in December, 1949. Sales of dryers in December showed an advance of 171 per cent over 15,282 in December a year ago. December ironer sales aggregated 38,300 units, a gain of 100 per cent over 19,400 units in December, 1949.

WATER HEATER SHIPMENTS REACH NEW "HIGH" IN 1950

Industry shipments of automatic gas-fired water heaters during 1950 totalled in excess of 2,300,000 units. This establishes a new "peak" year and compares with shipments of 1,466,000 units in 1949. The previous "peak" occurred in 1947 when shipments totalled 1,300,000 units.

Shipments of electric storage water heaters during 1950 totalled 990,000 units.

BUYS CHACE VALVE DIVISION

The purchase of the Chace Valve Division of W. M. Chace Company, Detroit, has been announced by James M. Garvey, president of American Laundry Machine Company, of Cincinnati. The valve division makes a meter-type water inlet for laundry washers.

INTERNATIONAL NICKEL BOARD CHAIRMAN DIES

Robert C. Stanley, 74, chairman of the board and former president of The International Nickel Company, Inc., New York City, died February 12.

A graduate of Stevens Institute of Technology, Hoboken, N. J., in 1899, Stanley joined International Nickel in 1901. He was general superintendent from 1914 to 1918 and first vice president the following four years. He was president from 1922 until last year when he retired from the post.

U. S. STEEL AWARDS CONTRACTS FOR NEW STEEL MILL

United States Steel Corporation has announced that it has awarded a contract to four firms for construction of its new $300,000,000 Fairless

When a TAM* field engineer calls...

You can obtain a wealth of practical, useful and authoritative information by discussing your technical problems with a TAM sales engineer. He is well equipped to work for and with you. More than ten years ago he received his degree in Ceramic Engineering from one of our leading universities. Since then, his education has been broadened by wide experience. In the field, he has had his coat off and his hand-in on more than a few plant projects. His advance information on new developments and applications is a valuable asset.

Here is a man ready to work with you. You will find him intelligent and cooperative—quick to understand your problems. Furthermore, he is your direct contact with a fully equipped and staffed headquarters that is the source of much worthwhile information and data. When your TAM engineer calls, get the full value that his background offers you.

TAM PRODUCTS
Registered U. S. Pat. Off.

*TAM is a registered trademark.

TITANIUM ALLOY MFG. DIVISION
NATIONAL LEAD COMPANY
Executive and Sales Office: 111 BROADWAY, NEW YORK CITY · General Offices, Works, and Research Laboratories: NIAGARA FALLS, N. Y.

Works steel mill at Morrisville, Pennsylvania, about 25 miles north of Philadelphia. It was indicated that construction would begin about March 1.

BINKS SPRAY FINISHING CLASS SCHEDULE FROM MARCH TO JUNE

The schedule of classes for their Spray Finishing School has been announced by Binks Manufacturing Company. New classes will be held Monday through Friday as follows: March 5 to 9; April 2 to 6; May 7 to 11; and June 4 to 8.

The classes continue under the direction of William Beecham, well-known paint chemist and spray finishing authority. The assembly and care of spray guns is taught as well as the operation and function of related equipment.

Executives, plant managers and foremen who are unable to attend in person are urged to make reservations for plant personnel who would benefit from this training. No tuition is charged, but students must pay their transportation and living expenses in Chicago.

For reservations or further information, write to E. F. Watts, Binks Manufacturing Co., 3122 Carroll Ave., Chicago 12, Illinois.

ADMIRAL APPOINTMENT

Harry H. Erickson, formerly service manager of Appliance Distributors, Inc., Chicago factory branch of Admiral Corporation, has been promoted to service manager of all of the company's branches, Clarence S. Tay, president of Admiral's distributing divisions, has announced.

Tay said that the new post had been created "principally to coordinate and intensify branch service operations, and to assure the best possible service for consumers during the critical times ahead".

LINK-BELT NAMES MANAGER OF NEW SOUTH AFRICA PLANT

Link-Belt Company has announced that its wholly-owned South African

subsidiary, Link-Belt Africa Limited, has purchased a 12,000 square foot manufacturing plant, with separate office building, on a 12-acre plot in Springs, Transvaal, 28 miles east of Johannesburg, for the purpose of manufacturing conveyor machinery and other Link-Belt products commonly used in South Africa.

John E. Petersen, formerly divisional engineer at the company's

"Paw sez ef VEDOC Defense Paint is good fer Army bombs an' rockets it should be jest right fer corn-squeezin's."

We don't go along with Paw's use of *Vedoc* Defense Paint here. But for Defense Contracts you have—or may get—our government specification finishes will fill the bill. Our World War II experience, combined with postwar research and increased facilities, enables us to offer you the best in Defense Paint. Your orders receive our prompt attention—whether they're for gallons or drums. Write today for samples and prices!

Remember, Ferro Is Set Up to Provide Complete Organic Coatings Service. From the Development of Diversified Protective Coatings—to the Designing and Installing of Efficient Finishing Oven Systems.

FERRO ENAMEL CORPORATION
LIQUID PLASTICS DIVISION
4150 East 56th Street • Cleveland 5, Ohio

Vedoc

Pershing Road plant in Chicago, has been appointed managing director of the South African company.

HEADS WATER HEATER GROUP

A. F. Cassidy, manager of the water heater sales division, Rheem

Manufacturing Co., New York City, has been elected chairman of the Gas Water Heater Division of the Gas Appliance Manufacturers Association. He succeeds Leland Feigel, of Servel, Inc., as chairman.

PRESIDENT OF GENERAL ELECTRIC

Ralph J. Cordiner is the new president of General Electric Com-

pany, succeeding Charles E. Wilson who is now chairman of the new Defense Mobilization Board *(January, 1951, finish)*. Cordiner, executive vice president and a director of the company since 1949, has been associated with General Electric for 24 years and served as manager of five of the company's departments during that period.

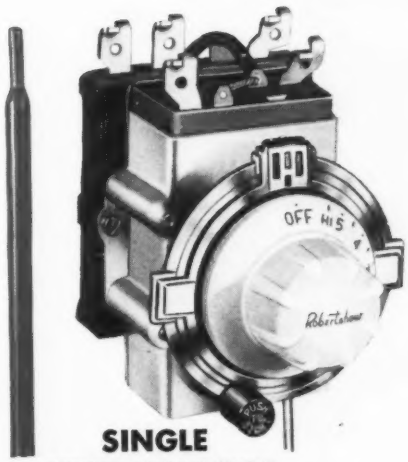
In 1942, Cordiner entered government service as director general of war production scheduling and vice chairman of the War Production Board. He rejoined the company as assistant to the president in 1943, and was elected vice president in February, 1945.

General Electric's plants, scattered from coast to coast, number about 120, and the company's over-all business is at an annual rate approaching two billion dollars per year.

DE VILBISS SALES, ENGR. CONF.

The DeVilbiss Company assembled all its district sales managers and field engineers from coast to coast recently at the company's main plant in Toledo, Ohio. The conference was called to review the 1951 sales program and determine what further

THIS Robertshaw® THERMOSTAT



SINGLE UNIT CONTROL OF MOTOR — TIME — TEMPERATURE

AUTOMATICALLY REGULATES DRYING CYCLE BY

AMOUNT OF LOAD AND

MOISTURE CONTENT

TO PRODUCE DESIRED DEGREE OF DRYNESS EVERY TIME

All the user does is set the dial and push the starter button. The control then takes over—and here's what happens, *automatically:*

1. Both the heater and the motor are energized
2. Amount of moisture and weight of clothes scientifically determine length of time dryer operates
3. Control cuts heat switch when correct internal temperature is reached, but —
4. Motor continues to run until all stored heat in drying chamber has been utilized
5. Control economical to install. Write for information.

In Home and Industry, *EVERYTHING'S UNDER CONTROL*

Robertshaw

THERMOSTAT DIVISION
ROBERTSHAW-FULTON CONTROLS COMPANY
YOUNGWOOD, PENNSYLVANIA

steps could be taken to achieve the greatest degree of standardization in engineering, manufacturing and sales of products. Some of the company's products includes spray finishing equipment, air compressors, exhaust systems, hose and connections.

WICKWIRE SPENCER APPT.

L. A. Watts' appointment as assistant general sales manger of the Wickwire Spencer Steel Division of The Colorado Fuel and Iron Corporation was announced by H. C. Allington, general manager of sales at the firm's executive offices in New York City.

DETREX NAMES WASHINGTON ENGINEERING CONSULTANT

W. I. Tebo has been appointed Washington engineering consultant and technical advisor for Detrex Corporation, of Detroit, according to an announcement by A. O. Thalacker, vice president and general manager.

Having recently returned from a special assignment in foreign countries, Tebo will make his headquarters at the Shoreham Hotel, in Washington, D. C.

FERRO ANNOUNCES NEW FINISHES SALES MANAGER

Liquid Plastics Division, Ferro Enamel Corporation, manufacturers of Vedoc organic finishes, announced through its manager, L. H. Miller, the appointment of Michael M. Carmody as central sales manager. In this capacity, Carmody will have charge of Vedoc industrial finishes in the southern half of Indiana, Ohio, and all of Kentucky.

Since 1922 Carmody has been associated with the manufacturing and selling of industrial and trade sales paints, varnishes and lacquers. Before joining Ferro, he was vice president and general manager of No-Motor Corporation, Cincinnati, Ohio, and for seven years manager of Permite Paint & Varnish. Prior to that he was assistant manager for a division of Pittsburgh Plate Glass Company.

MARTIN-SENOUR MATCHES GUILD COLOR PALETTE

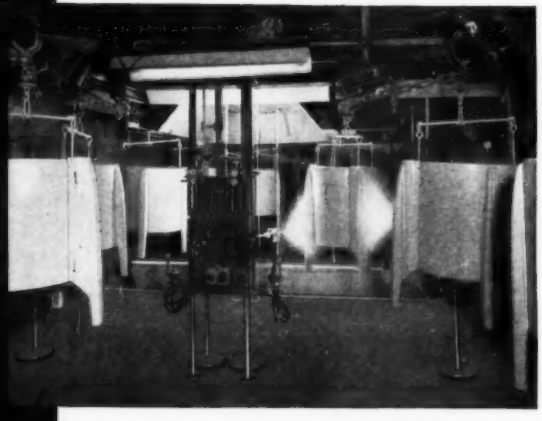
Martin-Senour Paint Company, Chicago, will manufacture paints for the entire new palette of Grand Rapids Furniture Guild Gallery colors,

Think of that!

300% INCREASE IN CORROSION RESISTANCE!

Achieved with the Addition of a Prime Coat and the Ransburg Process

That's an important factor in the manufacture of washing machines which are continuously subjected to the corrosive actions of soaps . . . salts . . . detergents and ordinary water.



Washers take on a sparkling, long-lasting finish when spray-painted electrostatically with RANSBURG equipment in the Speed Queen plant, Ripon, Wisconsin.

300% increase in corrosion resistance! Speed Queen got this quality improvement with the addition of a prime coat and changing to Ransburg Electro-Spray. Electrostatic application produces better coverage, a more uniform paint film.

And—automatically, too, on washer after washer! Consistently uniform results are obtained with only a part-time operator. *Actually, only 10% of one man's time is needed to control the painting operation.*

Want better quality on your paint job? Ransburg engineers can quickly analyze your painting requirements. Possibilities can be checked quickly in Ransburg's test laboratory.

Electrostatic Painting Processes

RANSBURG ELECTRO-COATING CORP.

Indianapolis 7, Indiana

RANSBURG

it was announced by William M. Stuart, president.

The paints will be packaged under the label of the Guild Galleries.

ENAMELERS TO DISCUSS FURNACE DESIGN, STATISTICAL CONTROL

At the next meeting of the Central District Enamelers Club, a talk on "Modern Porcelain Enamel Furnace Design" will be presented by E. W. Dany, chief engineer, Ferro Enamel Corp. Also, "Statistical Control" will be discussed by Howard Miller, quality control, porcelain division, and John Lannon, general foreman, range division, Westinghouse Electric Corporation, Mansfield, Ohio.

The meeting will be held Friday evening, March 9, at the Lake Shore Country Club, Cleveland, Ohio, according to M. Bozsin, Club secretary-treasurer.

CHI VIT NAMES O'LEARY V. P.

Maurice D. O'Leary has been named vice president of Chicago

Vitreous Enamel Product Co., it has been announced by Wm. Hogenson, president. O'Leary has been with the firm since 1927, serving as works manager and assistant to the vice president since December 30, 1947.

O'Leary was for five years in the general stores department of Ford Motor Company, Iron Mountain, Mich., prior to joining Chicago Vit where his first job was to take charge of general stores. He later became head of the purchasing department and was given the responsibility of office management in 1939.

BUIT ADVANCED BY PEMCO

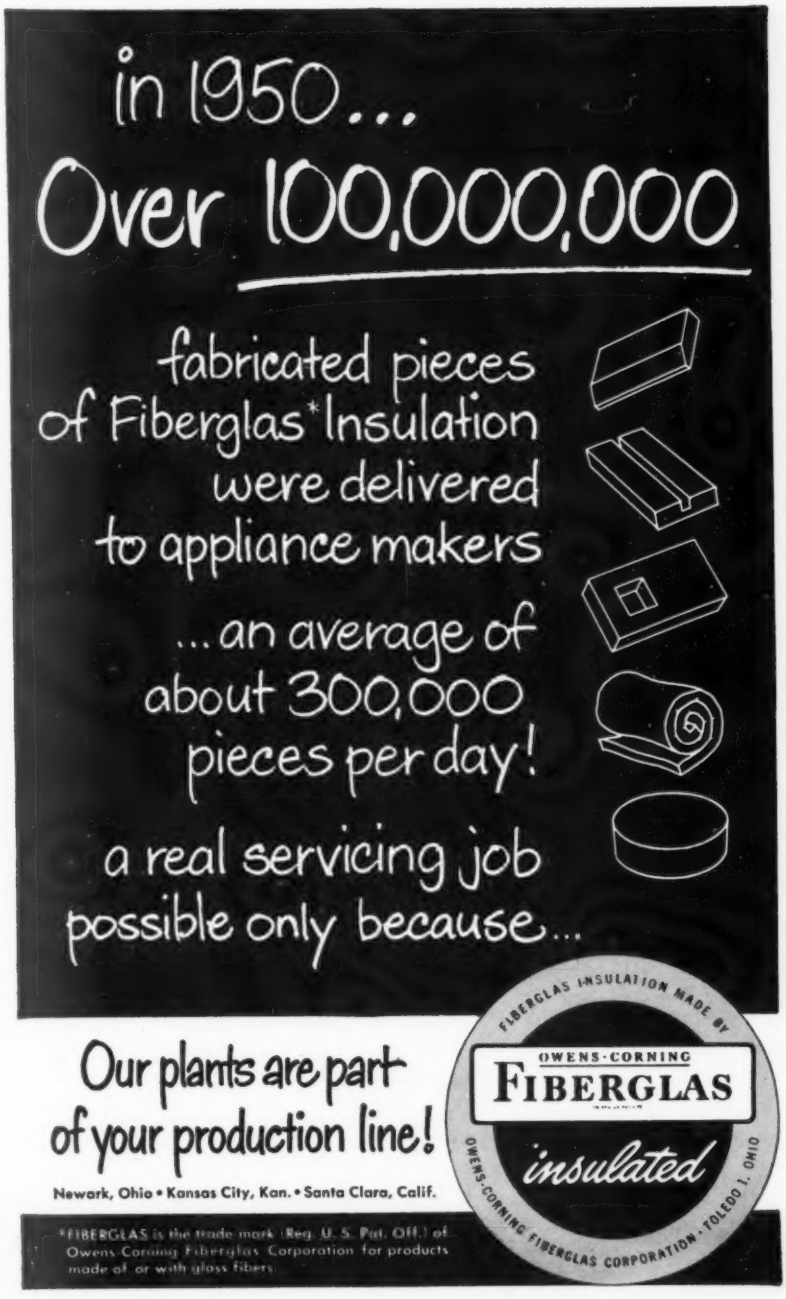
Theodore Buit has been advanced from service to sales engineer for the Western Michigan territory of Pemco Corporation, it has been announced by C. P. Lohman, general sales mgr.

At one time the youngest superintendent in the porcelain enameling industry, Buit joined Pemco in 1948 after 25 years with the Norge Division of Borg-Warner Corporation. His new office is located at 792 Amity Avenue, Muskegon, Michigan.

It was also announced that Ralph Foraker will continue as sales engineer for the company's Illinois-Wisconsin territory.

SOUTHERN STOVE WORKS SOLD

Southern Stove Works, Inc., Richmond, Virginia, has been sold to a


in 1950...
Over 100,000,000
fabricated pieces of Fiberglas* Insulation were delivered to appliance makers
...an average of about 300,000 pieces per day!
a real servicing job possible only because...
Our plants are part of your production line!
Newark, Ohio • Kansas City, Kan. • Santa Clara, Calif.
FIBERGLAS INSULATION MADE BY
OWENS-CORNING
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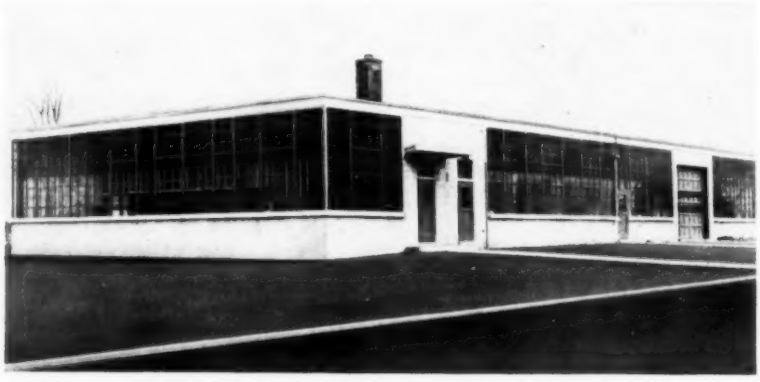
OWENS-CORNING FIBERGLAS CORPORATION • TOLEDO 1, OHIO
*FIBERGLAS is the trade mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corporation for products made of or with glass fibers

new firm known as Southern Steel & Stove Company, Inc., it has been reported by A. B. Bower, president of the new company.

FRANTZ COMPANY MOVES TO MODERN TRENTON PLANT



The S. G. Frantz Company, Inc., formerly of New York City, has announced the transfer of its sales and manufacturing facilities to a new modern plant recently built for their use on the outskirts of Trenton, New Jersey.

Frantz manufactures the Frantz FerroFilter, a magnetic separator for the extraction of iron particles from suspension in liquids or from granular materials, and the Isodyanamic separatic. This magnetic filter is used largely in metalworking, ceramic, food, chemical and plastic fields. The line of magnetic filters includes sizes from models suitable for very large quantities of material, down to those of laboratory size.

The new factory was necessary because of the increased demand for the company's magnetic separators, it was stated. The plant is a one-story steel and glass structure.

INDUSTRIAL ENGINEER SOCIETY MERIT AWARD TO PEMCO

Pemco Corporation was presented with the 1951 Merit Award of the American Society of Industrial Engineers for "excellence in engineering and manufacturing." The award is made by the society to one outstanding manufacturer in each basic industry and came, it was explained, in recognition and appreciation of Pemco's high standards in facilities, formulation, processes and products, and leadership in the ceramic industry which includes porcelain enamel and pottery finishes, porcelain enamel, pottery and glass colors, ceramic clays and related products which the company manufactures.

The presentation was made at a ceremony over a Baltimore television broadcast (WBAL-TV). Herbert Turk (right in photo), executive vice president of Pemco, accepted the award on behalf of his company from Robert L. Crinnian, national president of ASIE.

In presenting the citation, Crinnian declared "The award is significant of the Society's appreciation of signal contributions made by Pemco Corporation to the industrial arts and sciences. This company is the first industrial firm in the state of Maryland to receive such an award, and the twenty-seventh company to receive such an award in all categories of industry in the United States."

GERMAN STEEL SOURCE

New Amsterdam Import Company has been appointed as exclusive American agents for Pouplier Steel Mills, in Hagen-Kable, Germany, according to Ben Rosenbaum, president of the firm. Sales of Pouplier products are handled by an associate company, New Amsterdam Trading Corp., New York City, under the management of G. H. Shindler.

The well-equipped Pouplier Mills, founded in 1898, have increased their capacities to the point where they are producing substantial quantities of fine steel specialties for allocation to this country including: cast and hammered steels, cold rolled and cold drawn steels, hardened steels, and tool steels.

WHIRLPOOL UPS MITCHELL TO TOP SALES POST

Appointment of Robert M. Mitchell as general sales manager of Whirlpool Corporation, St. Joseph, Michigan, was announced by Elisha Gray, president. Gray also announced that LeRoy M. Howard has been promoted to sales manager for war pro-

to Page 77 →

For strength, durability and appearance of their finished products, enamelers have found U·S·S Vitrenamel the ideal base material.

The special surface texture of U·S·S Vitrenamel promotes maximum adhesion, so that sheet and coating fuse together. As a result the steel is protected against corrosion, and danger of scaling or chipping is minimized.

And the green and gold U·S·S Vitrenamel label is an added sales point for porcelain enameled products made from this quality steel.

FOR A FINER ENAMELING BASE

U·S·S Vitrenamel

USS TRADE MARK

UNITED STATES STEEL COMPANY, PITTSBURGH
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

finish SUGGESTION BOX

Production upped 20% with new brushing method

A 20 per cent increase in production, plus a uniform surface finish prior to plating is now being obtained by a large midwest sporting goods manufacturer by utilizing a new brushing method.

A five-station semi-automatic machine is solving the problem of removing heat treat discoloration and surface imperfections on tapered golf club shafts.

Due to the tapered "step down" design of the cold drawn, heat treated, alloy high carbon, seamless steel shaft, it was a problem to get into the "step down" corners. With the former method, two or three passes were necessary to do the job.

With the machine brush method, only one pass is required to turn out a better finish at a rate of over 1500 shafts per 8-hour shift, or 10 feet of shaft per minute.

The shaft is hand fed into the first station. A power in-feed keeps it moving until it passes the last brush. The first station breaks the discoloration; brushes are used to prevent bridging the "step down" corner.

Source for further information on this new brushing method may be obtained by writing finish.

Above: A 20 per cent production increase is being obtained with this five-station brushing machine. Brushes remove heat-treat discoloration and surface imperfections from tapered "step down" golf club shafts at a rate of 1500 per 8-hour day.

Left: The problem of getting into the "step down" corners is solved by this brush. With the old method, two or three passes were necessary to do the job. Now one pass provides a good surface for plating.

New laboratory . . .

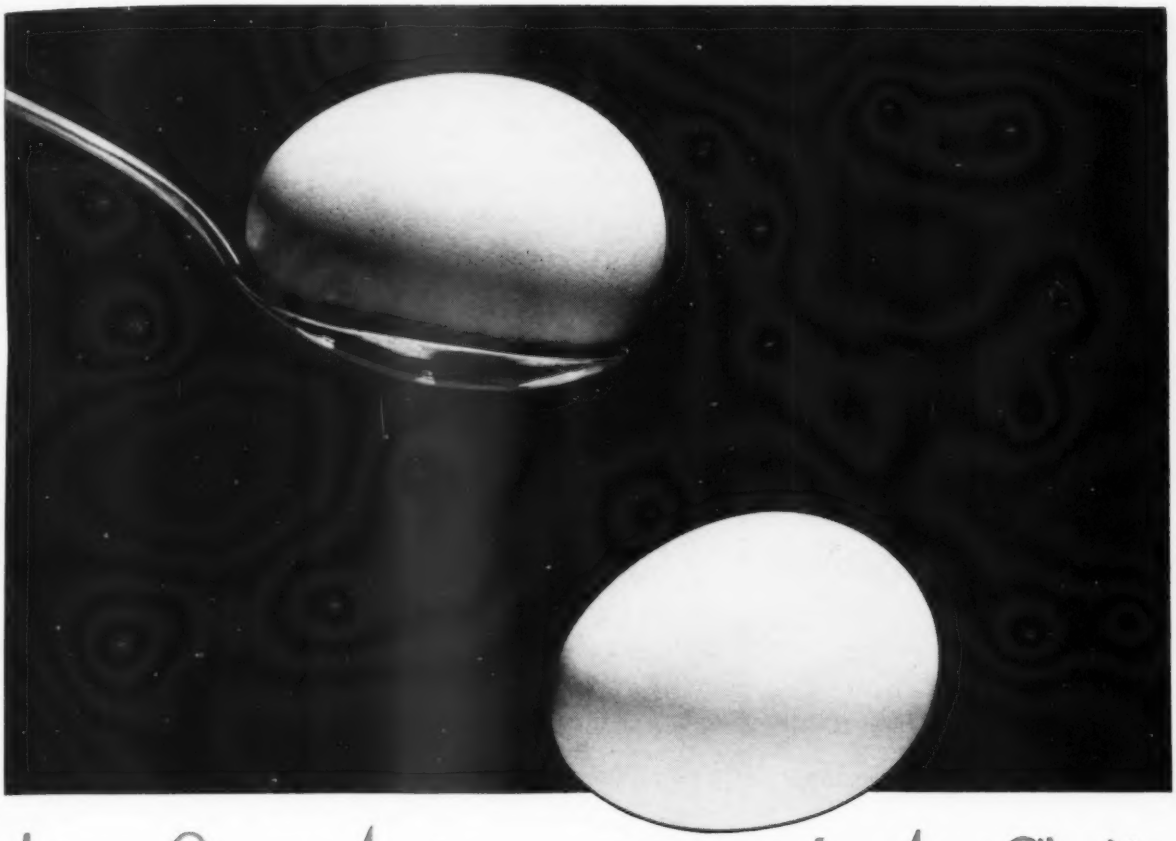
→ *from Page 34*

work. Further conditioned air is drawn through a two-inch opening running along the floor of each of the hoods by an exhaust blower on the hoods which removes about 30% more air than is delivered by the ducts. In this way, the ambient air at each machine is maintained at 29 ± 4°C.

Water-conditioning equipment, located on a balcony above one of the hoods, delivers recirculated, deionized water with about 1 ppm of dissolved solids at any desired temperature between 4° and 25°C. (± 1°C.) to the six machines in that hood. At present, to introduce a cyclic thermal shock to asphalt exposure panels, the equipment is operating at 5°C. and 25 pounds per square inch. The pH of the water is maintained by the deionizer at 6.2. Water for the other machines is delivered at room temperature and a pH of 6.0 by another deionizer. All machines can be operated with tap water if deionized water is not required.

Correlation with outside weathering tests

Because accelerated durability testing of exterior coverings does not at the present time permit a quantitative correlation with actual weathering, the National Bureau of Standards has constructed a set of exposure decks on the roof of the laboratory that will hold 3000 test panels. Materials are thus exposed concurrently on the roof and in the controlled laboratory. Data from these studies should provide some statistical correlation between outdoor weathering in the Washington, D. C., area and in accelerated durability testing in each of the machines.



You Can't Judge an EGG by Its Shell

–NOR A FRIT BY ITS LOOKS

● "Look-alikes" aren't always "do-alikes." There are two ways to buy a frit you can depend on. One is to buy every kind of frit available and run your own tests, selecting the one that performs best under your working conditions. That method is slow, expensive, and not always sure.

A much easier . . . much less costly . . . and much more dependable way is to buy a frit that has been put to the sternest tests of actual manufacturing use—under the same conditions that apply in your plant—and has had all the mistakes corrected *before* you get it. That's *plant-tested* PORCELFRIT, which is used right in our own job enameling plant. We know it's right before we ship it out, because it carries a perfect performance record.

You don't have to experiment . . . Ing-Rich does your experimenting for you—and the result is dependable, plant-tested PORCELFRIT.

INGRAM-RICHARDSON MFG. CO. OF INDIANA, INC.

OFFICES, LABORATORY AND PLANT, FRANKFORT, INDIANA

ING·RICH
PORCELFRIT
"The Plant Tested Frit"

the PLANT-TESTED FRIT

Low pressure spraying

→ *from Page 37*

hoping that there will soon be a plant test method developed which will measure the properties of "set" in relation to the spray characteristics of the enamel slip. In the meantime we will probably resort to checking "slump" and "pick-up", particularly when changes in clay are being tried. Two different clays may have the same pick-up and yet have different flow properties.

Spray Equipment

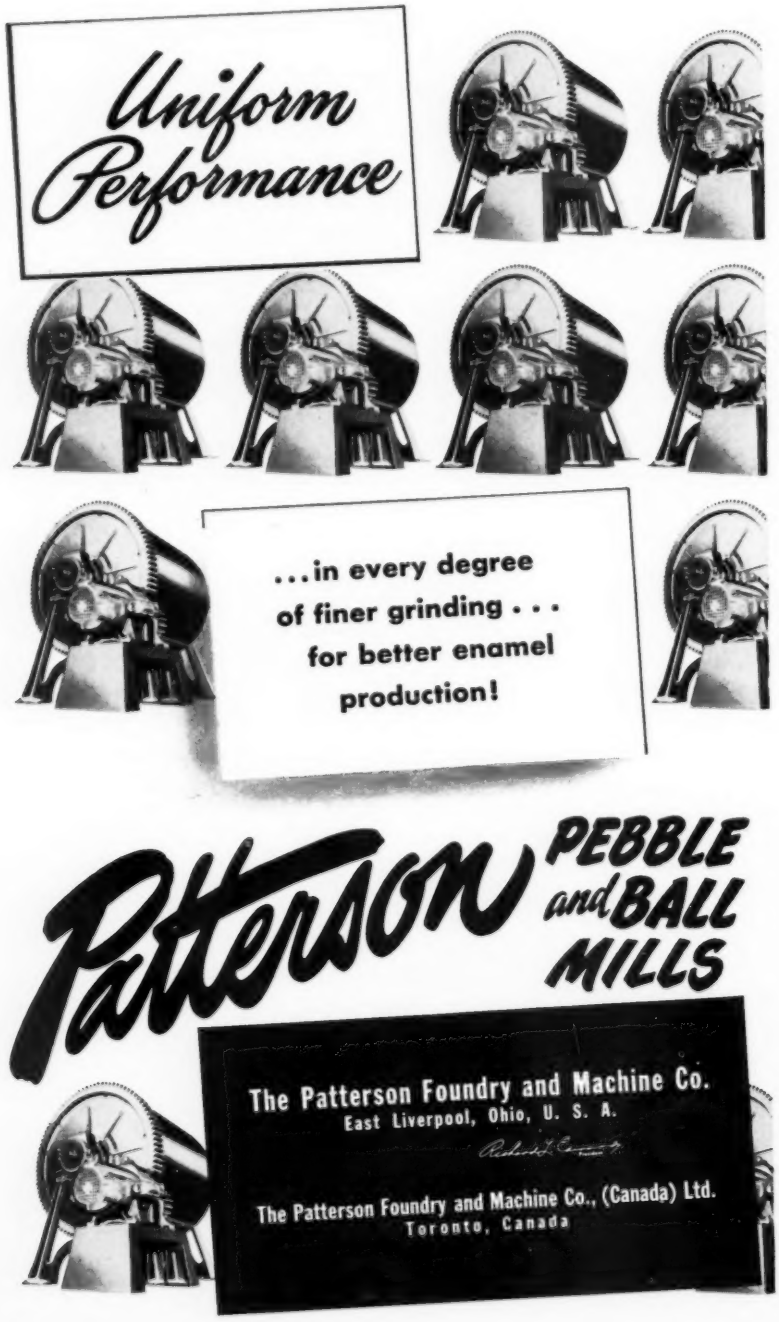
1. *Spray Guns*
   - *a. Air Caps*
   - *b. Fluid Tips*
2. *Regulators*
   - *a. Air*
   - *b. Fluid*
3. *Misc. Equip.*

Our work with the low pressure spraying of the zirconium enamels was carried on with little or no thought being given to the spray equipment. When the titanium cover coats had been in use for some time, changes in air cap and fluid tip combinations were given consideration. After several trips to another plant using recommended cap and tip combinations for the spraying of titanium enamels, we became educated and familiar with the technique so that changes could be utilized on our own spray lines. In addition to changes in cap and tip combinations, we later changed all our spray lines to spray guns with larger air and fluid passages.

In the selection of the equipment to meet the conditions of ware design, production rate, and type of frit on each spray line, it has been profitable to follow the manufacturers recommendations of air cap and fluid tip combinations. These are now being made on a more sound basis of fluid flow per unit of time at a given pressure range and air volume required for atomization. In the past several years the equipment manufacturers have made great strides in product improvement and technical service.

During the period that we were using zirconium enamels, the atomizing air was regulated only at the main regulator for each spray line. With the advent of titanium enamels and the changes in spray equipment, we found it advisable to install individual air regulators and gauges for atomizing air at each spray gun. The maximum air pressure permitted for the operation is set at the master regulator for each spray line and is controlled by supervision. The individual sprayer adjusts the pressure downward for best conditions at his station.

In our plant the enamel is delivered under pressure by pipe line to a spray header at each spray booth. The pressure tank is over 200 feet from the point of usage. The adjustment and maintaining of proper fluid pressure is the responsibility of the foreman and group leaders. Except for minor adjustment, the sprayer is not permitted to control fluid flow by the fluid adjustment on the


Uniform Performance
...in every degree of finer grinding . . . for better enamel production!
Patterson
PEBBLE and BALL MILLS
The Patterson Foundry and Machine Co.
East Liverpool, Ohio, U. S. A.
The Patterson Foundry and Machine Co., (Canada) Ltd.
Toronto, Canada

gun. We believe that the combination of proper fluid pressure and correct orifice size will provide definite control as well as a gun that triggers easily. Hose and hose connections for both air and fluid should be of the correct size as they are as important for satisfactory spray practice as wire size for electricity or pipe size for water. The fluid hose now in use is 10 ounces lighter than the hose formerly used.

It is our belief that the temperature of the atomizing air affects the spray conditions at the gun. An after cooler has been installed just ahead of the main regulating value at each spray booth for cooling the air. The humidity of the cool air is higher and aids in maintaining the set characteristics of the enamel during atomization.

Results

A material savings of 25% was effected through the changes in specific gravity and set of the zirconium enamels. When the change was made to titanium cover coats, a material savings of 45% was obtained. An 8% material savings was effected by changes in gravity, set, and spray equipment. (Table 1.)

The picture in the case of the other cover coat spray lines is not as complete due to equipment and product design changes and an overall department rearrangement. On the exterior cover coat line the changes in equipment and technique have given a material savings of 23%. (Table 2) The greatest change made on the automatic spray line was in atomization pressure, a drop from 125 pounds to 60 pounds. A material savings of 20% was obtained here. (Table 3). Our present effort is concentrated on this line with every indication for considerable improvement and additional savings.

The conditions on the ground coat spray line were complicated by an equipment layout which made it necessary to use the same ground coat for spraying as for dipping. Under such conditions the operation was far from satisfactory, with rough enamel surface and overworked sprayers. After separate equipment for spray ground coat was installed, the specific gravity was increased to 1.68, pick-up at 90 grams, and a 50 pound air pressure used. (Table 4). There was a material savings of approximately 10%, but the improvement in surface finish was tremendous.

Conclusions

The program of low pressure spraying practice has sold itself in our plant and is to be continued. It has been found that a very definite material savings can be made by reducing the atomizing air pressure to a minimum for good work, providing the specific gravity and pick-up of the enamel is adjusted to suit the air pressure, spray equipment, and the rate of production. Improved quality does result.

Acknowledgements

The writer wishes to express appreciation to W. H. Pfeiffer and R. J. Baker for their assistance in preparation of this article.

Recognition of the cooperation of A. S.

to Page 80 →

as simple as **A·B·C**

These components for the completely enclosed pipe-line type FerroFilter shows its simplicity of design. Simplified design, careful workmanship, and the finest materials are combined in an extremely effective electromagnetic separator that will give you long, trouble-free service.

To get the clean sparkling enamel finishes you want for your finished product, you *must* have clean, iron free enamel slips. Thousands of feet of magnetized edges of the FerroFilter grids form a protective wall against iron contamination.

The pipe-line FerroFilter will fit into your dip tank circulating system, and your mill unloading or liquid transfer systems to give you the protection you need. Gravity type FerroFilters are available for general use where a closed system is not required.

No modern enameling plant can afford to operate without adequate FerroFilter protection. They represent the lowest cost finish insurance you can buy.

Authorized Representatives for the Enameling Industry

Chicago Vitreous Enamel Product Co., 1425 So. 55th Court, Cicero 50, Ill.
Ferro Enamel Corporation, 4150 East 56th Street, Cleveland 5, Ohio

S. G. FRANTZ CO., Inc. Dept. F P.O. Box 1138 Trenton 6, New Jersey

Plant layout control

→ *from Page 30*

sible person can originate a request for a layout change. This request, bearing the signature of his immediate superior, is forwarded to the Plant Engineering office.

Here, after due study of the request, the costs involved, etc., a meeting of all interested parties is called. Details are then worked out, and an "Authority For Expenditure" form is originated. This form details the work involved, reason for the request, itemizes materials and supplies necessary, and provides a complete breakdown of all cost elements and accounting information. The form can then be blueprinted in as many copies as are required for proper handling by both the shop and business departments.

In operation since 1944, the Douglas El Segundo master layout system has proved its worth. Its advantages over the more conventional hand-drawn blueprint methods are obvious. A single person, well acquainted with the master layout panel, can answer questions or give advice that would require a bevy of experts with the older system. The system has proved its effectiveness in a plant totally geared to military production. Unless world conditions change in the immediate future, it is logical to assume that many more plants will be operating under similar conditions. Then, with fluctuating demands and contract requirements varying from day to day, effective plant layout control will become of major importance.

Three-coat paint system for coastal regions

→ *from Page 33*

Acid or alkali resistance test

This test was performed by periodically exposing test panels to an acid bath and then to air. The equipment is motor-driven and has a cam-operated arm on which the panels are hung. It operates on a four-hour cycle, two in the solution and two in the air. For the test a 0.5 per cent solution of hydrochloric and sulphuric acid is used.

The standard finish has excellent acid resistance and there is little difference between the standard finish and the mica-base finish after 500 cycles exposure or a total of 1000 hours in acid and 1000 hours in air. Deterioration first takes place at the extreme bottom edge of the panel due largely to the increased concentration of acid at this area. When the panels are removed from the bath for air exposure, drainage takes place. Evaporation of water during the drainage period results in increased concentration of acid at bottom of panel.

The alkali test is performed in a duplicate set of equipment. For this test an 0.5 per cent solution of sodium-hydroxide is used. There is quite a distinct difference between the effect of alkali on the standard finish and the mica-base finish. In the case of standard finish, the three coats were completely removed exposing bare metal which at the end of 500 cycles had begun to show a rust stain. In the case of the mica-base

If YOU DON'T SEE IT HERE ----
IT'S PROBABLY IN OUR CATALOG

If IT'S NOT IN OUR CATALOG ---
WE'LL DESIGN IT FOR YOU

THE FAHRALLOY COMPANY

150th & Lexington Ave. Harvey, Ill.

Guaranteed Results
in the
Pickle Room
with
Specification Materials
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Experienced Service

MANUFACTURERS OF LEPCO PRODUCTS

Suppliers to Porcelain Enameling Plants
CLEANERS • NEUTRALIZERS
DRAWING COMPOUNDS

V. B. PUNDERSON COMPANY
402 SWETLAND BUILDING CLEVELAND 15, OHIO

finish under the same exposure some deterioration of the final coat was shown, however, all three coats were intact and no signs of corrosion of the base metal were observed.

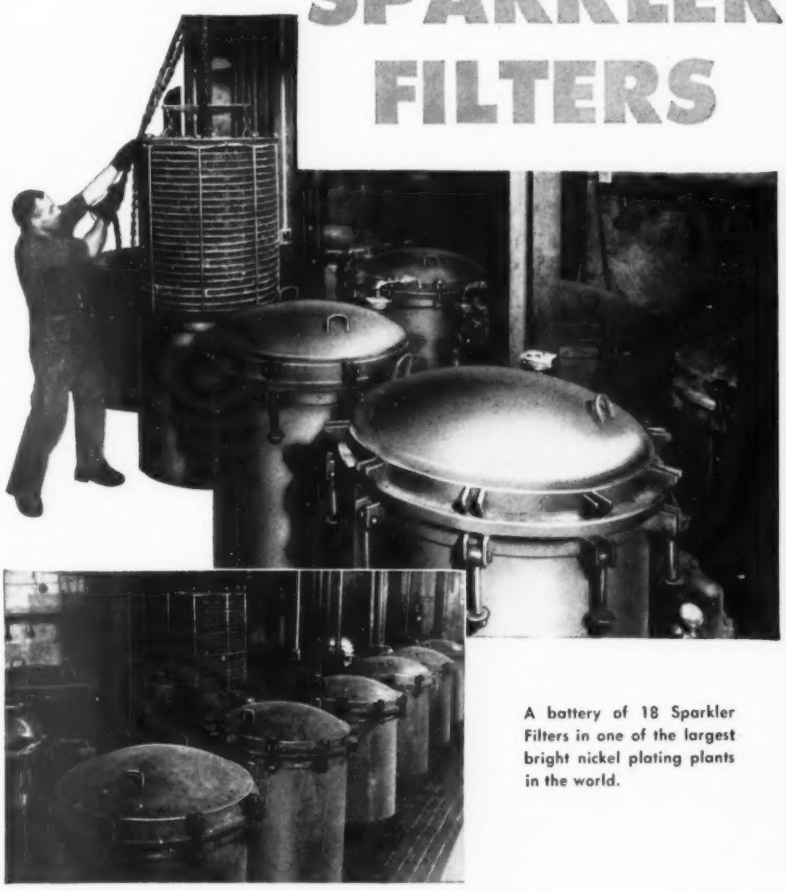
It is generally considered that one week's exposure to Weather-O-Meter conditions is about equivalent to outdoor exposure for a period of one year under average conditions. In the test, the panels are attached to a cylinder and rotated continuously. They are exposed to periodic cycles of one hour in fog and three hours under ultra-violet light. Neither finish showed severe deterioration. It was noted that the final coats on both the standard and mica-base finish showed some dulling and evidence of light chalking. Tests are being continued to obtain the ultimate life of the two finishes under this condition.

Panels of the standard three-coat finish and the three-coat mica-base finish were prepared and exposed on both Florida and California Coasts. At the end of eighteen months none of the mica-base panels had shown signs of corrosion. The standard panels showed edge corrosion and rust creepage to the extent of about one-sixteenth inch in from the edge. Some chalking had taken place on both panels. This was particularly true for the panels exposed on the Florida Coast. It is interesting to note that the panels exposed on the California Coast at San Francisco still have most of the original gloss.

This three-coat, mica-base paint system of the baking type was developed specifically for pole-type distribution transformers. The goal was to develop a finish that would better withstand the widely diverse atmospheric conditions under which these transformers must operate. The results of laboratory and field tests show that the Coastal Finish is superior to the finish previously used on distribution transformers; that, as a result, the service life of the finish will be more than doubled. Many industrial-type paint systems have been tested but the mica-base system described shows superiority over all examined to date.

NO SHUT DOWN

To Carbon Treat Solution with SPARKLER FILTERS



A battery of 18 Sparkler Filters in one of the largest bright nickel plating plants in the world.

Carbon treatment without shut down is accomplished by cutting out one or two units in a battery of filters, removing the cartridge assembly of filter plates, and replacing with a new plate cartridge dressed with clean filter paper. The proper amount of carbon is mixed with water in a standby tank and recirculated through the filter thus depositing the carbon on the new plates in a cake of uniform thickness and density. The solution requiring a carbon treatment is then circulated through the carbon beds giving the plating solution the carbon treatment without contaminating the tank or stopping plating operations.

The quick change feature of the plate cartridge in Sparkler filters permits replacing a set of plates in a matter of minutes. Production can be resumed without appreciable interruption.

Sparkler Horizontal Plate Filters give absolutely sharp filtration at all stages of the cycle.

SPARKLER horizontal plate FILTERS

SPARKLER MANUFACTURING CO.
Mundelein, Illinois

A highly mechanized plant for sinks, bathtubs and kitchen cabinets

(Continued from Page 28)

enamel. Over the mill room is a storage room where the frit and other raw materials are kept. Water used is chemically distilled to remove impurities. Mills are loaded by gravity feed from the overhead storage. The mills include a 4000-lb., four 2000 lb., and one 100-lb. mill.

The ground coat slip is screened and pumped with rubber-lined pumps to porcelain-lined storage tanks through magnetic separators. The white enamel is class AA acid-resistant, and is required to withstand 10 per cent citric acid solution for 15 minutes without discoloration. Before use, the milled enamel is again centrifugally screened and passed through magnetic separators before loading the pressure tanks for the spray booths. A total of fourteen 60-gallon portable pressure tanks with air motor agitators are used in the porcelain enameling department.

Process control

Every precaution is taken to insure a quality product, while every possible modern production aid is utilized which will contribute to operating efficiency. Hourly checks are made on all solutions in the spray pickle machine. Temperatures are automatically controlled and checked hourly. The water used is chemically distilled and analyzed.

A complete enamel laboratory, adjacent to the mill room, has facilities for testing raw materials and maintaining quality control. Furnace temperatures are exactly controlled in all zones and a record maintained and checked.

PRODUCTION OF CABINETS

Kitchen wall and base cabinets and undersink cabinets are produced in Plant No. 1. The units are assembled on special dollies and progressively welded at four stations to make the complete frames. As the dollies are returned to their starting position, the doors are installed and fitted to complete the unit. The cabinets are then transported to the cleaning and painting department by electric floor trucks.

The painting department is housed in a protected area and is completely self-enclosed and contains a paint mixing room. Six dip tanks for cleansing and phosphatizing are serviced by an electric hoist and trolley. Equipment includes four paint spray booths and two baking ovens.

Use of infra-red heating

Ovens are 100 feet in length with a 1600 unit capacity on an 8-hour shift. They are infra-red heated—rating 1000 KVA—maximum temperature 350° F. This area is served with four independent overhead chain conveyor systems.

The finishing process is as follows. The cabinets first pass through the six dip tanks with the following steps: washing solution; first hot water rinse; second hot water rinse; phosphatizing solution for improving the paint bond and inhibiting corrosion of the steel; cold water rinse; and acidified rinse to remove foreign matter and stabilize the phosphatizing coat.

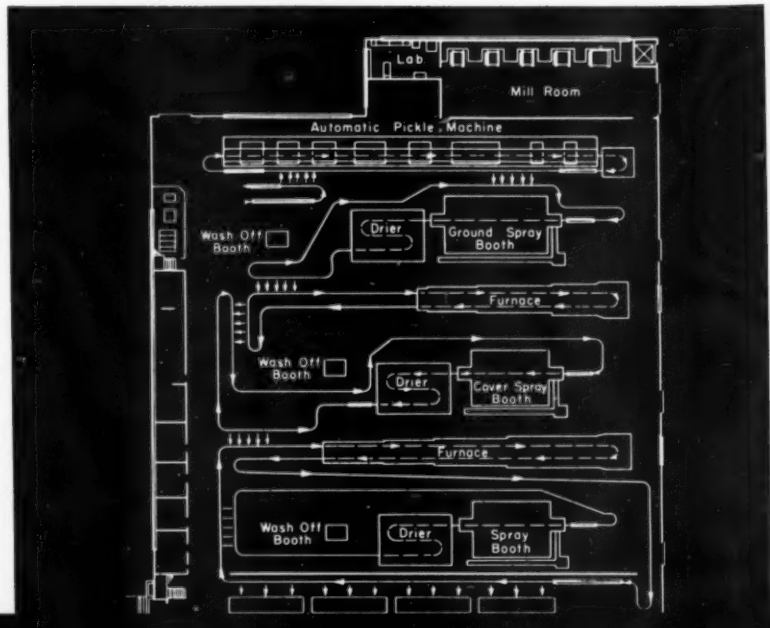
Cabinets then pass through a drying oven where a temperature of 350° F. is maintained. In preparation for synthetic enameling, the units are further dried by an air blast and then wiped with a tack rag. The tack rag operation includes wiping the entire surface with the "tack cloth."

The cabinets are then conveyed to a paint spray room where all surfaces are sprayed with a prime coat of synthetic enamel. They then take a 35-minute trip through a baking oven at a temperature of 310° F. Following sanding of rough spots and more tack wiping, the cabinets pass through another paint spray booth for the application of the finish coat which is then baked on in another 35-minute trip through a baking oven at a temperature of 300° F. The finished units are then inspected, kick plates and hardware installed, and then conveyed to the packaging and shipping area in Plant No. 2.

Provision for expansion

Provisions have been included in the original plans of Plant No. 2 for increased production facilities when required. Furnaces may be enlarged, and the entire plant is arranged for expansion. The space now devoted to shipping and crating can be used for additional processing equipment, while the mill room is designed so that it can be moved out to provide additional pickling capacity. Space has been provided at each end to add to the length of the building.

Flow Chart for Kaiser Metal Products Plant No. 2



It's what is UNDER the cover that counts

"DON'T JUDGE a book by its cover" can logically be paraphrased to read "Don't judge a finish by its surface appearance." Century cover coats have surface appearance and durability, but any porcelain enamel finish must have the right ground coat to insure lasting durability.

"Start right from the steel out" is more than a slogan — it represents a policy and belief at Century that without a good, easy-working, trouble-free ground coat with good adherence or "Grip" no finish can give trouble-free service for the life of the product.

Check with any user of Century ground coat enamel and you will find them enthusiastic. The millions of pounds of Century ground coat frit that are used every year by our customers give extra assurance of trouble-free finishes, both in the shop and on the finished product.

If you haven't tried this economical, trouble-free enamel, contact us and we'll see that you have the opportunity.

FRIT from CENTURY FRIT MASTERS

CENTURY VITREOUS ENAMEL COMPANY

6641-61 S. Narragansett Ave., Chicago 38, Ill.

New Supplies and Equipment

C-10. New electronic accessory for paint spraying

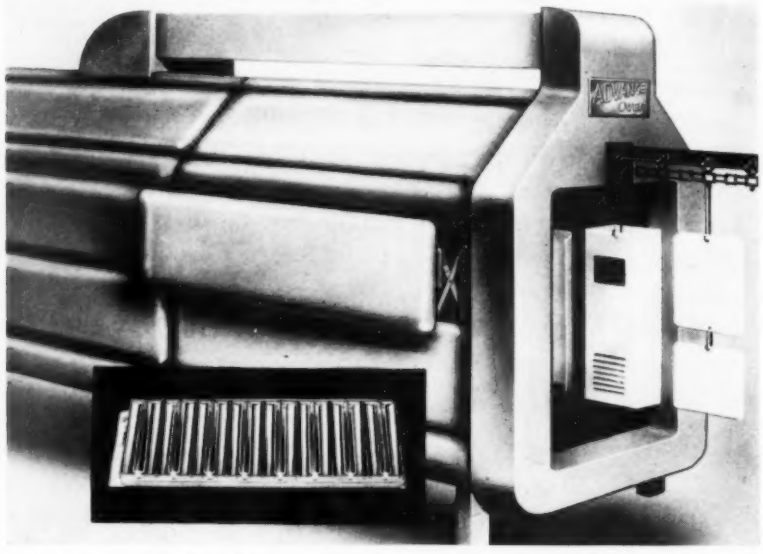
A new electronic accessory for paint spray units has been announced. It is known as the "Paint-Miser." According to the manufacturer, this new unit operates on the electrostatic attraction principle which precipitates up to 95% of the paint spray on the work, greatly reduces overspray, and cuts paint waste to a minimum. The savings in paint alone, it is claimed, pay for the unit quickly.

The manufacturer further states that the Paint-Miser gives better, more uniform surface coverage with no build-up on edges. Articles like metal cabinets, metal furniture, light fixtures, and other items, which ordinarily are difficult to coat, can be sprayed easily, quickly, with practically no hand touch-up. Adaptable to any finishing department, extensive changes in spray booths, plant layout or conveyors are not necessary. The equipment is portable.

More Information

For more information on new supplies, equipment and literature reviewed here, fill out the order form on page 62, or write to us on your company stationery.

C-11. New radiant heat oven from standard units

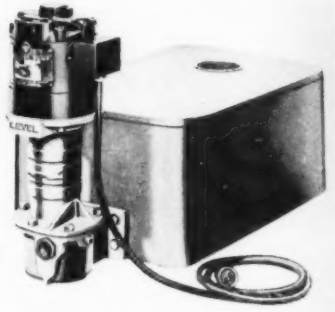


A new type of industrial oven construction, composed of low-cost electric heater panels from standardized members, introduces the use of high efficiency rod-type heaters mounted on insulated oven wall sections. This combines radiant heating with temperature-controlled convection for industrial heating and drying operations up to 700° F.

Ovens of any size, shape, and heat capacity can be field-assembled from standard parts by electric maintenance personnel. Rod heaters of any standard brand name may be specified. Heater panels can be added to the entrance end of continuous-type ovens and driers now in use.

No welding is required for assembly. Provisions are made for maintaining all vital parts from outside the oven assembly.

C-12. Coolant equipment



A single-unit coolant pump and tank, for use on wet machine tools, meets the needs of a multiple-spindle drill press up to 8 spindles. The centrifugal-type pump is mounted directly to the tank with a flat machined flange — no piping is required from the pump to the tank. A six-bladed impeller is connected directly to the motor shaft.

C-13. High temperature refractory

A new refractory, fused stabilized zirconia, is said to be capable of withstanding temperatures up to 4600° F.

NEW LITERATURE

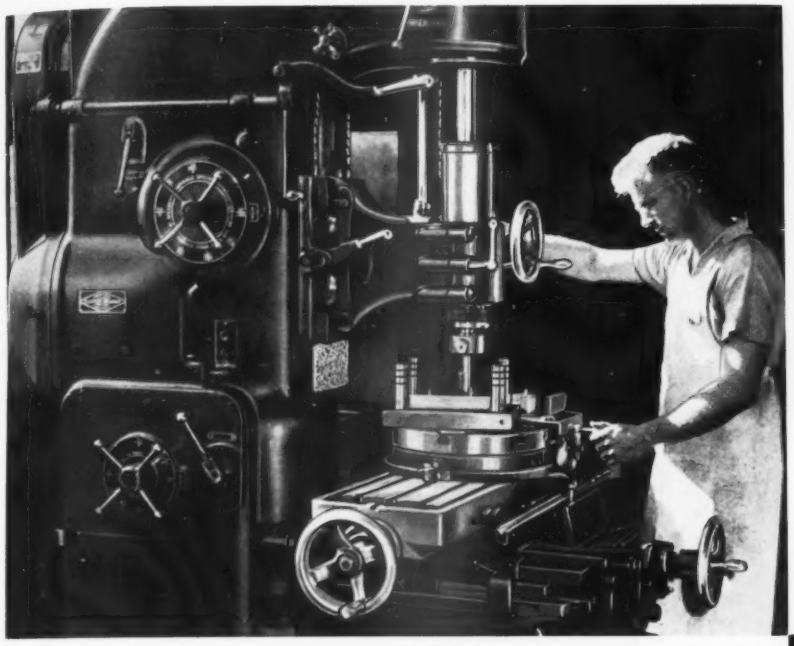
310. Dies for difficult drawing and forming operations

Information on complicated dies and tools for difficult sheet metal drawing and forming operations is contained in a bulletin describing new methods and techniques in stamping. The bulletin illustrates a variety of large and complex stampings. It has been stated that the new tooling method eliminates welding and troublesome strains in stamping operations such as double-sump sinks, leaving the part in perfect condition for finishing operations.

311. "Free enterprise in action"

For a great many years, Armco Steel Corporation has been attempting to show its employees the advantage of the American Way of Life, usually in terms of their own jobs.

About five years ago, the company began to use the back page of an employee publication, "The Arm-Co-



Our services include everything from blueprint to shipping carton: dies, jigs, stampings, assembly, finishing and packing for shipment.

IN PEACE AND IN WAR

New Monarch's Record Speaks for Itself

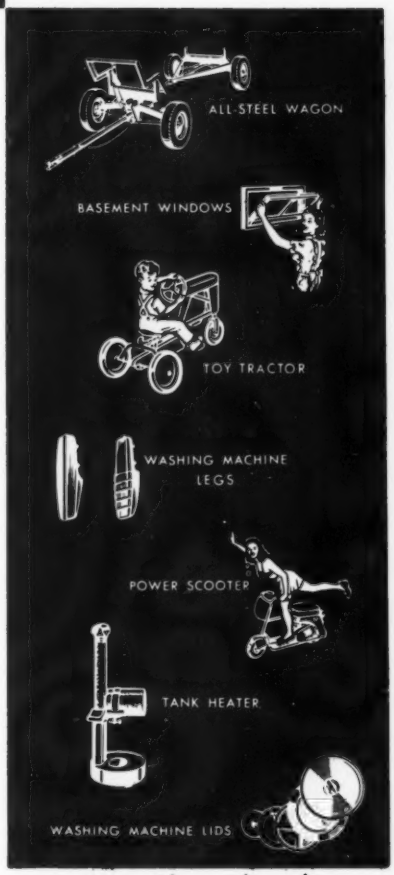
The invaluable knowledge and specialized experience gained by New Monarch during its 40 years of steady growth and service have won for it a name truly outstanding in the metal stamping industry.

New Monarch's facilities are readily adaptable, too, to defense production. This was proved in World War II, during which it contributed whole-heartedly—and in no small measure—toward winning the final victory.

So, too, in the present emergency, we stand ready to do our part, in whatever capacity required. Meanwhile, we will continue for our numerous clients the same efficient service which has made the New Monarch name synonymous with quality the country over.

New Monarch offers you a complete service, from blueprint to shipping carton, dependent, of course, on the availability of materials.

For information, consult our engineering department



MONARCH QUALITY

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Operator," to carry to its people the story of "free enterprise in action."

The series of so-called "ads" created demand from other industries for copies. This encouraged Armco to publish a selected group of these "ads" in a booklet—just off the presses—titled "Raindrops of Understanding."

312. Information on lithium

A current publication is wholly devoted to lithium in ceramics. The issue constitutes a wide coverage of information on raw material subject currently of widespread interest in most all branches of ceramics.

313. Buffing & Polishing catalog and data book

A new catalog, "Buffing & Polishing Compositions," is just off the press and is available to plating and finishing shops or departments for the asking.

Containing valuable information on buffing and polishing, the catalog is replete with charts showing compositions to use on all types of materials from aluminum to zinc, composition tests, characteristics of various kinds and grades of composition, and much other useful data.

Send requests for your copy of the booklet on company letterhead.

314. Screw machine products guide

A new "guide" booklet, containing suggestions for practical and economical designing of screw machine products, has been released by the National Screw Machine Products Association. This booklet is a revised release of a guide that has long been used by industry and its customers. Copies are available at 25 cents each, remittance with order to the association office at 13210 Shaker Square, Cleveland 20, Ohio. Just say "I saw it in *Finish*."

315. Case histories on use of pallets and containers

Case histories on how wirebound pallet boxes can be used to reduce materials handling costs, and how wirebound containers can be used to provide better in-transit protection for finished appliances and other metal products are contained in a new booklet.

316. Production test to conserve nickel — new booklet

A new tested method for determining the weight of thin nickel coatings used in preparing metal for porcelain enameling has been announced. The process is designed to conserve this critical material, the supply of which is being limited for non-defense production.

The nickel tests fills the need for a rapid non-destructive "weighing" method to help control the actual weight of nickel coatings, which are an important factor in developing a strong enamel-to-metal bond in porcelain enameling applications. A regular plant workman without professional training can administer the test. The new method eliminates time-consuming tests and require no special samplings or destruction of parts being tested. The method can be applied to products in process if desired. The booklet sells for 25 cents per copy.

317. New aluminum data book

A new 194-page publication has just been issued to meet the demand for more factual information on aluminum alloys and mill products.

Many vital facts on aluminum alloys and mill products have been condensed into this handy pocket-size manual which contains 117 tables of data on physical, chemical and mechanical properties; standard tolerances; weights; standard sizes and production limits; as well as much fabricating data. Included are tables showing relative corrosion resistance, the action of many chemicals on aluminum, elevated and low-temperature properties, fatigue strengths, minimum bend radii, joining methods, finishes for aluminum, and other data and information.

Send requests for your copy of the data book on company letterhead.

318. Protecting aluminum alloys

A 24-page booklet, entitled "Amorphous Phosphate Coatings for Protection of Aluminum Alloys and for Paint Adhesion" by Douty-Spruance, includes comprehensive technical data on protection for aluminum. Booklet is replete with photographic exhibits and charts. Free copies are available upon request.

319. Direct reading hardness filter

A new bulletin featuring a direct reading metal hardness tester has just been issued. It is stated that by just pressing the handgrips on the sides of the instrument, immediate direct "at-the-job" readings are obtained of all types of metals. The bulletin includes pertinent illustrations and detailed principles of operation, advantages and applications.

FINISH
360 N. Michigan Ave.
Chicago 1, Illinois

Please forward to me at once information on the new supplies and equipment and new industrial literature as enumerated below:

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No._____ **No.**_____ **No.**_____ **No.**_____

Name _____ **Title** _____

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Company Address _____

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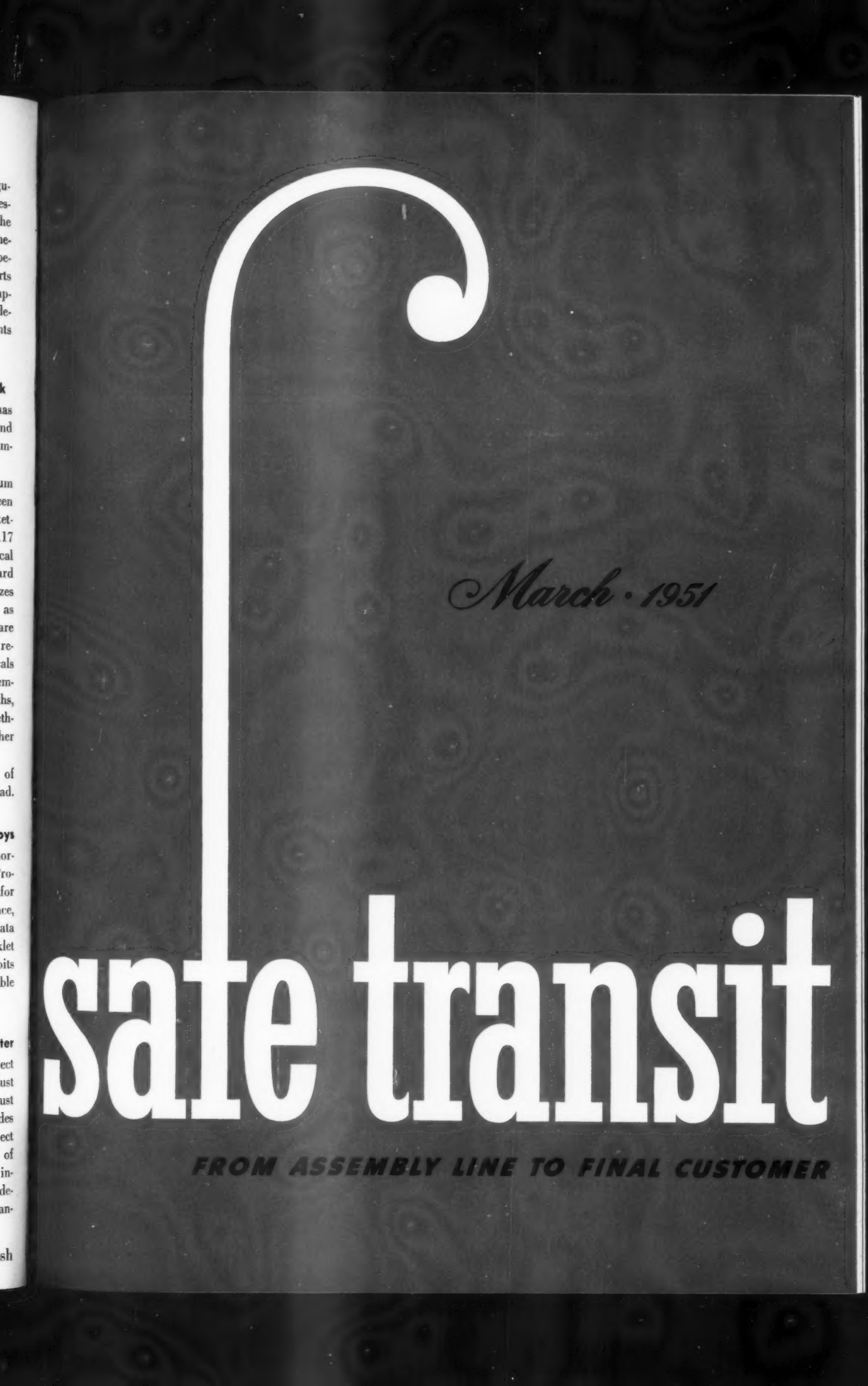
March · 1951
sate transit
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safe transit

A monthly trade publication section devoted to improved packaging and shipping and materials handling practices in the home appliance and allied metal products field.

Plant experience information for all executives and plant men interested in the problem of packaging and shipping improvement and loss prevention.

Complete information on the National Safe Transit pre-shipment testing program for packaged finished products, and detailed progress reports of divisions and sub-committees of the National Safe Transit Committee.

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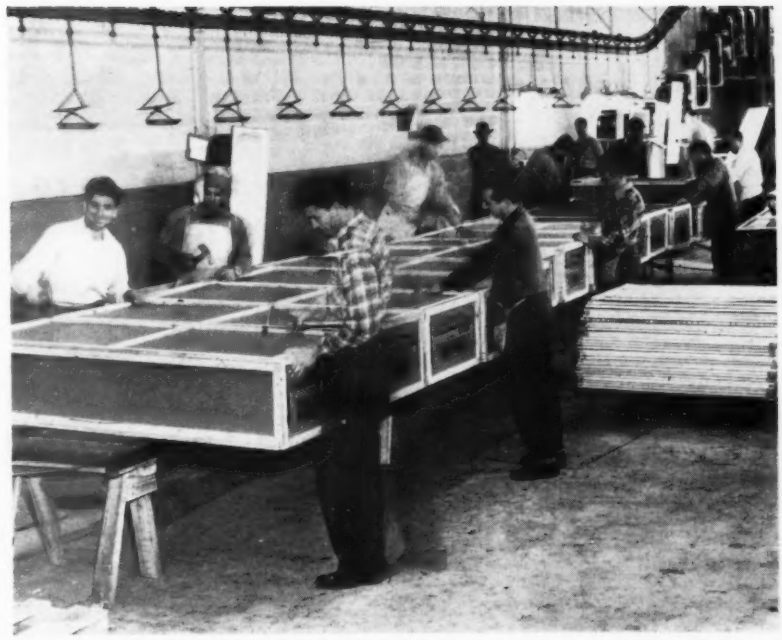
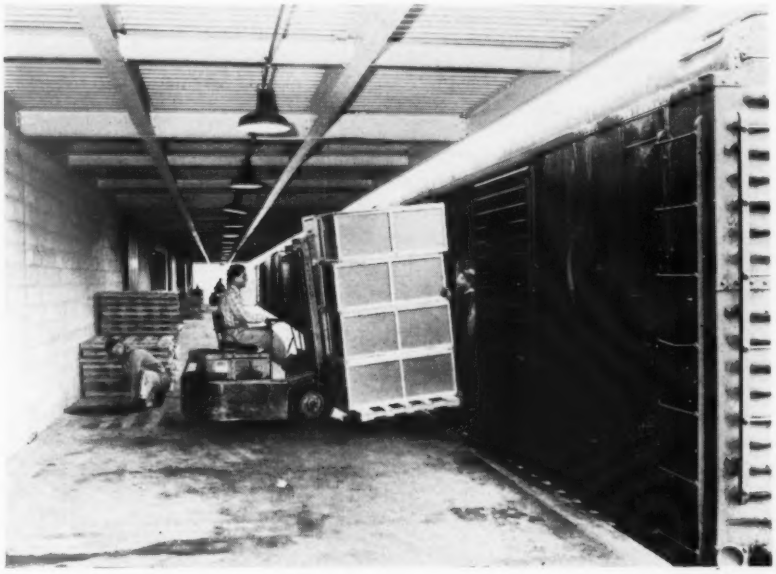


Inspection, handling and shipping at Kaiser Metal Products

(see feature article starting on page 25)

Photo above shows transportation conveyor carrying finished ware past inspection station (background) to packing and crating conveyor. Finished ware is packed in corrugated paper board and wooden cleated cartons. The ware is held at all times to at least ¾" clearance around the six sides of the carton by air cells formed by inserting 200-pound test, "C" flute corrugated paper board. Photo below shows method of loading crated products from covered loading dock to cars with fork trucks. An 1800-foot railroad spur serves loading dock from west side of plant.



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The TRAVELING BILLBOARD

Features

1. The container is a traveling billboard—2 color printing tells your product story on one or all the four sides of the container.

2. It is light in weight—weight saving up to several pounds can be made in practically every case.

3. It saves packing time—it reaches the user 75% assembled.

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5. It has extra strength—superior to ordinary containers in product-carrying strength.

6. It resists "weave"—it will carry more top load and resist "weave" better than open-type crates.

Watkins Containers save time in the shipping department; give better protection in transit. Major appliances and any other similar products that can be shipped in a wooden crate can be shipped better in this container. Weights up to 800 pounds are being shipped.

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- Steel Kitchen Cabinets
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- Unit Heaters
- Sinks
- Pumps
- Water Softeners
- Furniture
- Gas and Electric Ranges
- Oil Burners
- Caskets
- Stoves
- Radio and Television Sets

These companies build WATKINS containers

Cornell Wood Products Co., Hummel & Downing Division	1514 E. Thomas Ave., Milwaukee, Wisconsin
Cozier Container Corp.	446 E. 131st St., Cleveland, Ohio
Crate-Rite Mfg. Corp., Div. of Pacific Ports Ind. Inc.	10901 Russet St., Oakland, California
Dura-Crates Co.	940 E. Michigan St., Indianapolis, Indiana
General Box Co.	500 N. Dearborn St., Chicago, Illinois, and 16th and Maple Sts., Louisville, Kentucky
Hemb & Martin Mfg. Co.	Watseka, Illinois
Illinois Box & Crate Co.	811 Center St., Plainfield, Illinois
Kieckhefer Box & Lumber Co.	1715 W. Canal St., Milwaukee, Wisconsin
Lane Container Corp.	10212 Denton Rd., Dallas, Texas
Lewisburg Container Co.	243 Singer St., Lewisburg, Ohio
Love Mfg. Inc.	608 S. Commerce St., Wichita, Kansas

—an inquiry to any of these companies will get prompt attention—

The · WATKINS CONTAINER · Manufacturers

"Pre-proving" pays

a story of improved packaging practice and savings in dollars and cents

by Chas. D. Mallingly • PACKAGING ENGINEER, THE COLEMAN COMPANY, INC., WICHITA, KANSAS

The Coleman Company has been strongly cognizant of the value of "pre-proving" *(pre-shipment testing)* our products' safe-shipping ability for many, many years.

Several men responsible for Coleman's packaging problems before myself had set up various pre-proving test procedures. However, most of these tests were not based on a scientific analysis of the many problems involved, such as those tests recommended by the National Safe Transit Committee.

Trial and error vs. scientific methods

For example, one standard test for small appliances was a tumble *roll down two flights of back stairs.* If the product was damaged after landing at the bottom of the stairs, more pads were added. While this practical but unscientific test was responsible, in a measure, for Coleman products reaching their destination in marketable condition, it frequently led to excessive packaging costs.

Another test involved advance shipment of a dozen or so products across the country and back. Since no possible control could be had in such a transit, luck, rather than science, was often the determining factor. But whatever its shortcomings, it did serve to sell management on the idea that there was more to packaging than stuffing a product in a box, barrel or crate. Its use alone, however, without scientific pre-proving control tests, often led to the approval of many packages that did not prove satisfactory under sustained shipments.

Three years ago Coleman purchased a package vibration testing machine and earnestly attempted to set up *pre-shipment, "pre-proving"* test procedures.

Savings from one test paid for test machine

The value of these tests was immediately apparent. We had been suffering exceedingly high finish damage losses on a particular oil space heater. After trying almost every known protection method, we were unable to get to the root of the trouble. *Within one hour after installing our new package testing machine, we learned not only the cause of damage, but also how we could insure correction of the trouble. Savings gained by this one test easily paid for the machine.*

The trouble was in the method of securing the base of the heater to the frame. Sheet metal screws, under sustained vibration, worked loose. This set up a chain reaction which destroyed all other interior packing. It was a simple matter to change production methods so that the screws would hold fast.

Since this first controlled test made us firm believers in the value of proving package design in advance, it is now a standard procedure, not only for all new products, but also as a periodic safety check on all products in steady production.

At present, our package test procedures also make full use of the Conbur incline impact test and the free fall drop. The methods used follow closely those recommended by the National Safe Transit Committee.

Some may wonder why all this testing? Why make packaging complicated? Almost everyone but the package engineer seems to feel that packaging involves only the undesired added expense of putting a product in a box in order to properly ship the product to its ultimate consumer.

But regardless of what production and sales people may think, the package should be considered an integral part of the finished product, and the function and cost of the package should therefore be studied scientifically just as any other feature of the product is studied. This study involves a relatively new science called "Analytical Package Engineering" which has proven by tremendous factual savings, both protective and costwise, to answer a definite need of industry.

Take 4 basic steps before shipment

To the package engineer, each package represents his company's products and goodwill. To him the evaluation of successful packaging involves practically as many design complications as the product itself. The process may be outlined in four basic steps:

1. *Work toward a rectangular package,* surrounding the product with a six-sided container in order that it may be easily handled, stacked, loaded, warehoused and shipped. Few production products will successfully maintain safe shipment records that deviate from this rule. The few that do are usually designed so that multiples of the packaged product will stack rectangularly.

2. *Adequately cushion* the product and its component parts within the

rectangular container so that shocks and bumps in handling will not damage contents of the package.

3. *Protect against puncture and finish damage* by securing the product with non-scratching materials, allowing a safe air cell distance between the product and the inner surface of the container.

4. *Pre-prove* the product's safety by thorough testing before the product goes to market. Pre-shipment testing is the only sure guarantee that adequate cushioning has been provided and that the intent of the design and original air cell protection will be maintained at all times until the product is delivered to the consumer.

The first three of these basic steps simply outline the package engineer's problems. Each one, however, is an important scientific study, analytical package engineering—a "must" if the manufacturer is desirous of obtaining the best possible package which will carry his company's products safely and economically to the consumer.

The fourth step, "pre-proving," requires little knowledge other than that required to follow the simple procedural tests recommended by the Safe Transit Committee. Pre-shipment testing is actually the most important packaging step since it proves the primary intent of package design—which is to insure that the packaged product will arrive safely.

Obviously, the method of developing a good package is mainly dependent upon the package engineer's experience, knowledge of the many possible packaging combinations, materials, personal resourcefulness, inventiveness, and methods for analyzing the records of package development.

Pre-shipment testing, however, is dependent only on the manufacturer's desire to follow practical and relatively simple rules which have been worked out for him. Unfortunately, the very simplicity of "pre-proving" rules seems to invite violations and short cuts.

Short cuts are expensive

It has been our experience that almost invariably when damage reports become frequent for any one product, a re-study of the package proved an error in our package design. We had failed to afford the product the protection we had intended for it. Furthermore, *in all such cases it would be a package where we failed to give a thorough pre-shipment test.*

In one case we were a victim of our own enthusiasm. The package had been carefully designed. It looked good. We failed to give it a thorough test. Subsequent events proved that there is no substitute for "pre-proving."

Another case, which probably should be classed as due to the human element in packaging, occurred on a product that presented a difficult packaging problem. The final design had consumed considerable time and a production schedule had to be met. Lacking further ideas for improving the package, and with time running out, we elected to short-cut pre-shipment testing procedures. Again, it proved that there is no substitute.

Distributor relationships and dollars and cents savings

In general, we know our distributor relationship is hurt when products arrive in a damaged condition. It obviously is to our advantage to spend as much money for packaging as is necessary to insure safe delivery of our products.

In dollars and cents, analytical package engineering—of which "pre-

The author (left) and Ed Cory, chief production engineer at Coleman, start a vibration test on a packaged oil heater.

proving" is an essential part—has reduced packaging costs for The Coleman Company approximately $150,000 per year. Pre-shipment testing should be given credit for half of this savings. Without this testing we would have been reluctant to experiment with some of the new package designs currently used on production items, and, if we had experimented, many package failures would have occurred which could have been corrected only by the study of return damage memos.

Editor's Note:

The Coleman Company has just been selected as one of three companies to present their packaging programs before the American Management Association's Packaging Conference to be held in Atlantic City in April. Mr. Mattingly, author of this article, will present a paper covering Coleman methods of "Analytical Package Engineering."

True, products in constant production can be safely protected by careful study of return damage memos. This "Time Will Tell" method, however, should be called "Telling with Fines" since package errors on high production items can prove exceedingly expensive before a source of trouble can be located, corrected, and changes incorporated in production.

These points are mentioned because we realize that no packaged product is complete until full "pre-proving" tests assure that the product is *safe*.

AMA PLANNING PACKAGING CONFERENCE PANEL SESSIONS

The American Management Association has announced that its annual Conference on Packaging, Packing and Shipping will be held at the Auditorium in Atlantic City, April 17, 18 and 19, the first three days of the 20th National Packaging Exposition.

Featured will be a panel session at which representatives of the Army, Navy and Air Force will discuss government specifications for packaging,

to Page 74 →

it's a fact

Improved Shipment Protection Can Be Achieved at Lower Cost

For years, manufacturers of home appliances have paid a heavy toll in shipping damage claims. Early attempts to correct this took the form of heavy car bracing—with costs for materials alone running as high as $17 and more.

Signode field engineers, working with shippers and carriers, developed this modern method of carload bracing — a scientific combination of steel strapping and lightweight wood bulkheads.

The results are typified by this on-arrival picture of a carload of kitchen ranges. Damage—none; cash savings on materials used—$7.16; reduction in dunnage weight—115 lbs.!

it's a fact to remember!

Regardless of what, where or how you ship, the improved packaging and shipping techniques constantly being developed by Signode steel strapping specialists are worth investigating . . . today if you're engaged in **DEFENSE** or **ESSENTIAL** civilian production . . . or **TOMORROW** when the need to cut costs and increase sales may become more urgent than ever before.

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this seal SIGNODE *means security in shipping*

Cushioning materials and methods for current packaging needs

including developments in the cushioning field—from rubberized fiber to popcorn—for use in packaging products for civilian and military use

by S. L. Swenson • PRODUCT ENGINEER, KIMBERLY-CLARK CORP., NEENAH, WISCONSIN

WITH the onset of an increasingly accelerated economy, concepts of basic problems in every industry have suffered change. There is no question but that the production problems for preparing domestic goods have been affected vitally, as well as have those to provide our Armed Forces with their mushrooming requirements in safeguarding our national defense.

Industrialists, not only in the United States but throughout the world, learned many lessons from packaging experiences—some of them painfully evolved during World War II. Rapid strides in methods of packaging, cushioning, corrosion prevention, and materials handling, were made in short periods of time, many at costly expense, but which might have taken years in peace time. Such products as "V"-board, non-asphalt containing laminated kraft papers, "vapor-phase inhibitors" for corrosion prevention, foil and plastic barrier sheets, "float-packaging" cushioning techniques, and many others resulted not only from the high rate of productivity in research and technical fields, but from the increased tempo of interest in packaging to meet specific military and civilian needs.

More and more of the average person's daily life is associated with materials and equipment which have as part of their mechanism *delicate instruments*, switches, fragile tubes, regulating devices, and similar easily broken or damaged equipment. Each and every one of these units must be examined for appropriate packaging or cushioning before shipment. Seldom, nowadays, is the original fragile instrument produced and then used in the same plant where it becomes a vital part of the consumer goods.

Frequent transferring of products from one conveyance to another is becoming more the rule than the exception. Not only are there transfers from truck to rail back to truck carriers again, but the trucklines themselves interchange freight from one to another, with resulting added handling operations. Such frequent handling, like moving your household goods, causes products to be exposed to many factors causing damage. It is a matter of debate whether the frequent handling experienced in product shipment is the cause of more damage than the action to which a package is subjected because of its movement in transit on a carrier.

Packaging and cushioning for military products

With the greatly expanded military activity in recent months, and pro-

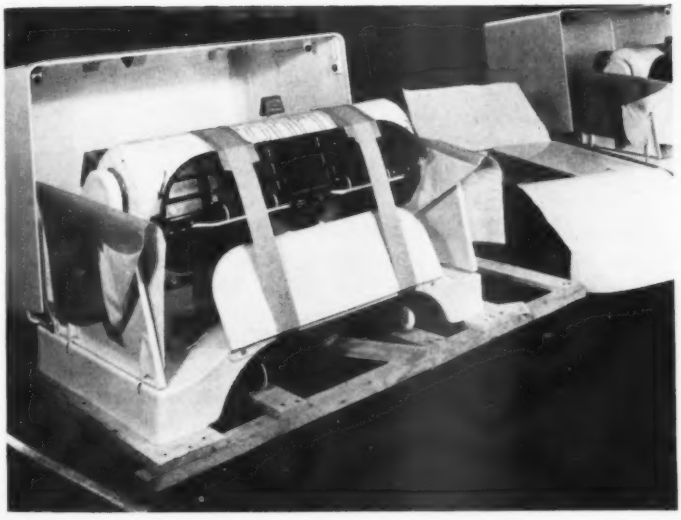
A delicate aircraft instrument is heavily cushioned as it is placed in shipping container.

Television tubes must be very carefully cushioned and packaged in order to insure safe shipment.

Geiger counter tube is "rolled" in cushioning material before insertion in metal container.

protection for appliances

Visible in this photo are part of the materials used in cushioning range components. Note that door and drawer corners are cushioned and then tape-closed. Deepwell cooker is protected in its own compartment.



In packing the ironer for safe shipment, a combination of soft cushioning materials and strong tape is used to protect finished parts and to hold movable parts stationary.

A soft layer of cushioning materials is used to effectively protect the entire top surface of this automatic clothes dryer.

posed expenditures of millions of dollars more, the matter of providing packaging and cushioning for the Armed Forces is becoming a complex problem. Suppliers presently are hard put to keep up the demand voiced by military procurement sources. As a result, many civilian users are finding their orders cut back, and their normal demands put on an allotment basis by their suppliers.

Through the latter part of World War II, and also since that time, considerable educational activity has been spearheaded by military packaging groups, packaging laboratories, and packaging and materials handling organizations in an effort not only to get civilian users of packaging and cushioning materials to use such materials correctly and economically, but also to see that military using agencies did a better job with what was supplied to them. Waste, it was recognized, is always associated with war. However, a premise was made and stressed so that, through proper utilization of correct materials, what the economy was able to provide might be made to go farther. Much activity by suppliers, in particular, was directed at assisting supply depots, transfer units, and packaging stations in the military organizations to use their best techniques in employing packaging materials.

Government specifications

Federal and Military Specifications have been and are being formulated for cushioning materials, as well as for other products used by the services. Two of the specifications are: (1) *Federal Specification UU-C-843, June 19, 1950, Cushioning Materials, Cellulosic.* This is a high eschelon specification prepared by the Bureau of Federal Supply, and is used and recommended for procurement purposes for all service branches of the Military. (2) *Military Specification MIL-W-6163 Wadding; Creped Cellulose (for Aeronautical Use).* This is the old AN-W-18A specification covering creped cellulose wadding. Long familiar to cushioning procurement agencies for all service branches, AN-W-18A has now been

given the new Military Specification coding of MIL-W-6163.

Every package has individual requirements

Every package has its individual and peculiar requirements. There is no hard and fast rule on how to package most items—seldom can a formula be applied to come out with valuable to civilian and military services alike. It is the point where a technician is able to provide savings which most shipping room personnel seldom can provide. Shipping room personnel, as a rule, are able to provide only the specified wrapping and protection to a product, or those protective measures which they are accustomed to taking. Seldom do shipping room personnel provide the improved package designs which make for long-term economical shipping costs.

Packaging designers in past years have found it advisable to think more in terms of *basic fundamentals* and logic, rather than "material normal for the job in the past". Like technicians in other fields, the packaging designer must understand basic concepts of package preparation, be fully acquainted with the many packaging, cushioning, and container units available, and must be able to use his knowledge in correctly applying materials to the nature of the product.

In cushioning, the packaging designer is best able to supply his knowledge through an understanding of the *basic fundamentals* of good cushioning. All cushioning problems can be broken down into one or a combination of the following four basic categories:

1. Bracing
2. Blocking
3. Flotation
4. Finish protection

Cushioning methods

Following are the fundamentals of the four basic cushioning methods, including a few of the protective materials which fit most suitably into the cushioning methods.

Bracing is a method of interior packing designed to prevent movement of contents within a container and to distribute the weight to all of its faces. This method uses cushioning materials in conjunction with wood bracing, metal strapping, or corrugated fibreboard forms. The functions of the cushioning material is to prevent scratching, press marking, burns, etc., by the coarse "holding" material. Cushions are applied in strip or pad form *at bracing points only* and usually range from ⅛″ to ½″ in thickness. The finish or texture of the product to be "braced" determines the type and bulk of cushioning material specified. Products with coarse or with no special finishes can be padded under the bracing points with excelsior pads, corrugated fibreboard, macerated newsprint pads, etc. Highly finished products must be padded with finer cushioning materials, such as hair felt, wood fiber felts, creped cellulose wadding, cotton blankets, etc.

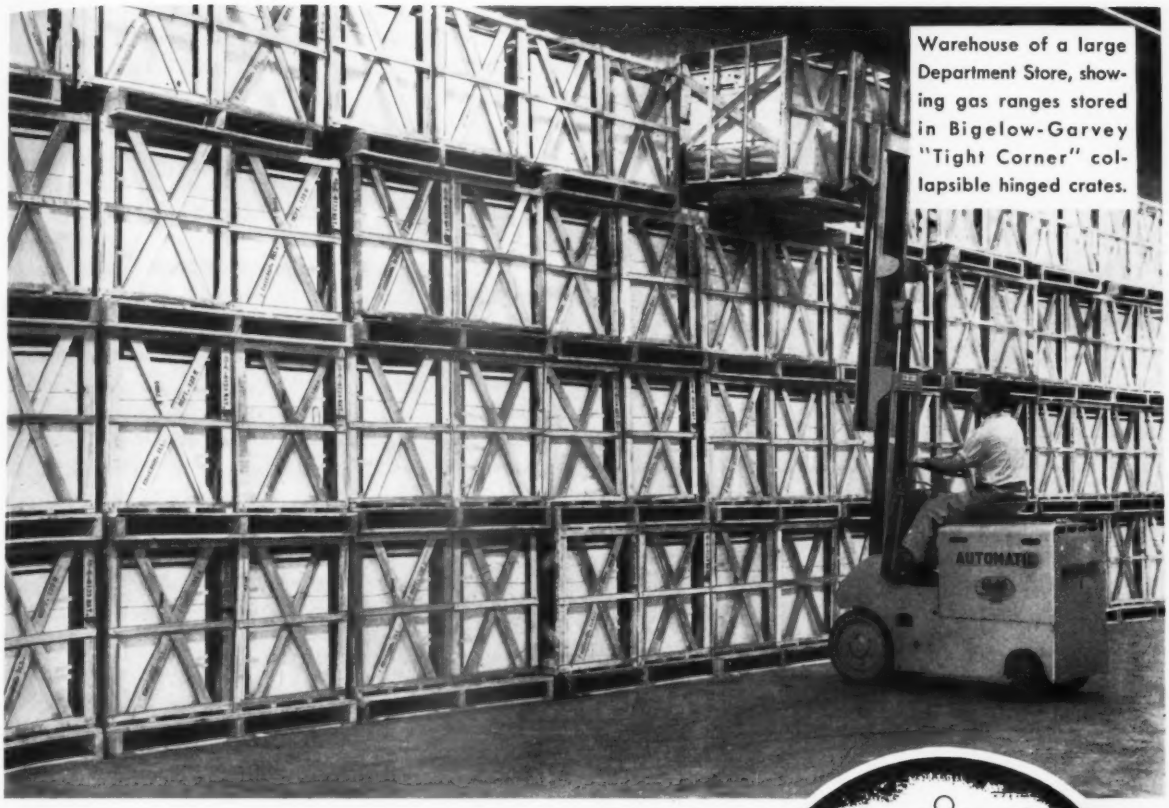
Blocking is the second basic cushioning method and involves wrapping irregularly shaped objects with soft, resilient cushioning materials to "block out" the voids. The resulting package becomes fairly regular in shape and comparatively easy to insert in a container. Localized high stresses are avoided at projecting, vulnerable points. Distribution of shock is facilitated by the cushion through transmitting such shock loading evenly throughout the article. Blocking is accomplished with soft conformable cushioning material, such as felt, cotton, rubberized or curled animal hair, creped cellulose wadding, shredded newsprint, and wood fiber felts. Thickness of blocking materials range usually from ¼″ up to 2″.

Flotation is the third basic cushioning method. As its name implies, it is a method of completely protecting an article from shock and vibration by wrapping it or literally "floating" it in a thick cushioning material. Flotation-packed products are literally suspended within the shipping package. The more resilient the cushioning material, the better its performance. Cushions of specially designed materials, such as cotton, creped cellulose wadding, wood fiber felts, or rubberized animal hair in thicknesses of ½″ to 3″ make the most effective flotation mediums.

Some specialized packs involve the use of wire springs to suspend the product within the center of a container to keep it from contact at all sides. Expensive electron tubes, in particular, are flotation-packed with such springlike mechanisms. Another new flotation material developed and offered recently for packaging use is *rubberized Tampico fiber*, a Latin-American vegetable fiber, with considerable natural resilience, coated by a latex material. *Popcorn*, normally thought of as something only to eat, made its appearance in the past year as one of those strangely different yet utilitarian materials for floating fragile articles within a container.

The Navy is a large user of compressed creped cellulose cushioning for "float" packing. The creped material is prepared in "compressed" high density condition for shipment and storage. In use the high density wadding is stretched to a desired lighter density and applied around the product. Many thousands of units of Navy material are quickly float-packed by low cost labor in the large Naval Depots for storage, or for domestic or export shipment. The Packaging Sections of the Naval Depots have found that it is easier to train labor to successfully apply packing cushioning by the "float" method than by any other type—fewer mistakes are made and material gets through better. Accordingly, cushioning material costs can be slightly higher than by other methods, yet the "over-all" or comprehensive packaging cost may be lower.

Finish protection is the fourth and last fundamental cushioning method. This method involves application of relatively thin cushioning materials to protect highly finished and delicate surfaces of metals, wood, plastics, or glass from damage by contact with other articles or other packaging materials which can cause abrasion or chemical action. Usually, comparatively large areas of the product, such as surfaces contacting corrugated spacers, are finish-protected. Many products cushioned by

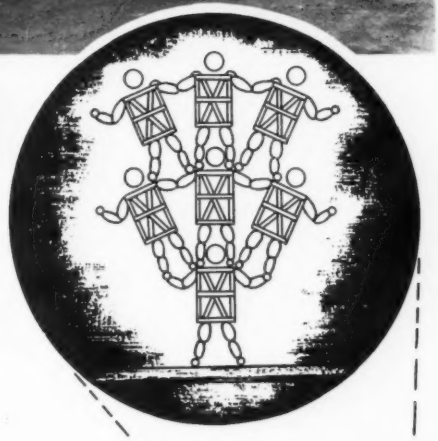


Warehouse of a large Department Store, showing gas ranges stored in Bigelow-Garvey "Tight Corner" collapsible hinged crates.

STRENGTH

for STACKING . . . for HANDLING

There is STRENGTH in the Bigelow-Garvey "Tight Corner" collapsible crate—strength to handle all normal transportation and handling hazards—strength for stacking to all normal heights for storage.



Bigelow-Garvey crates are engineered for your particular product, built of the finest crating materials and accurately manufactured in all details.

The "Tight Corner" hinged crates offer rigidity, strength, lightness and ease of assembly not found in ordinary crates. This is due to the fact that they are 65% assembled. (Only 3 parts—top, bottom, and collapsible tube.) Labor for assembly in your plant consists of nailing top and bottom in position. (Nail holes are pre-drilled as a time saver.)

We will welcome the opportunity to help you find the right answer to your shipping problems, whether they pertain to civilian goods or to equipment and supplies for defense. Write us *now* and you can soon begin to save money and reduce shipping losses.

Manufacturers of ranges and *all* types of home appliances are turning to the "Tight Corner" collapsible crate for assurance of safe delivery of their finished products.

Write us regarding your shipping problems

BIGELOW-GARVEY LUMBER CO.

General Office and Laboratory

320 West Huron Street, Chicago 10, ILL.

MILLS: ARKANSAS GEORGIA WISCONSIN MINNESOTA ILLINOIS

large quantities of coarse fiber blanket or dunnage material have finish-protecting layers applied beforehand to give the necessary softness against the skin of the product. This prevents chafing, rubbing, or burning action which might otherwise mar the surface of many damage-free products.

Finish-protecting materials are usually those materials ⅛" or less in thickness which have proven they can do a satisfactory job in this respect. Such materials as cotton and creped cellulose wadding do an outstanding job of finish protection. Some of the glazed and waxed kraft papers, properly secured to the product in question, are successful in protecting delicate finishes. In the past year, Pliofilm and Polyethylene films have been introduced and have become extremely important contenders for a place in the finish-protecting field. Corrugated fibreboard may have one of its surfaces waxed, to make the skin less abrasive to highly finished consumer products.

New refrigerator protection

A new product just entering the market—but already used with much interest by General Electric Company in protecting its refrigerators—is built-up corrugated fibreboard (1" thick) surfaced with creped cellulose wadding. Some of the producers of coarse blanket cushioning materials have begun to face their products with anti-abrasive, finish-protecting type of surfaces. Some of the thicker cushioning pads and blankets—like wood fiber felt, cellulose wadding and cotton—are, of course, perfectly satisfactory as combination finish-protecting and shock absorbing mediums.

In correctly applying these finish-protecting materials, the protective medium is tightly affixed to the merchandise. Movement within a package (some shifting, vibratory internal movement always occurs in transit) must be relegated to surfaces outside of, or away from, the surface of the merchandise. This is the ideal treatment! Because the ideal treatment is so seldom fully realized in actual performance of the package, it is important that the finish-protecting medium be soft, non-abrasive, and conformable!

Packaging conference..

→ *from Page 69*

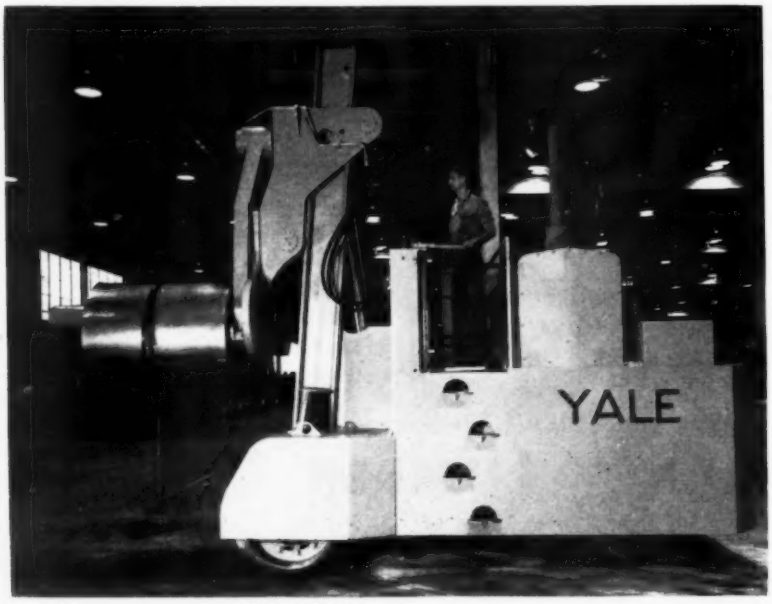
and answer questions from the floor. Reports on new technical advances in packaging, and on the probable effect of government demands on the availability of the various types of packaging materials, will be given also. In addition, representatives of leading companies will present case histories of their packaging problems.

Paul O. Vogt, coordinator of package engineering and development, manufacturing policy division, General Electric Company, is in charge of the conference. He will be assisted by a number of authorities in the packaging fields, among which are the following:

Jack L. Ware, packaging and quality standards, Sears, Roebuck & Co., Chicago; W. B. Keefe, packaging engineer, Westinghouse Electric Corp., Mansfield, Ohio; D. W. Pennock, factory engineer, Carrier Corporation, Syracuse, N. Y.; J. D. Malcolmson, technical advisor, Robert Gair Co., Inc., New York City; and Henry J. Howlett, president, Container Laboratories, Inc., New York City.

Fifteen per cent more exhibit space has already been contracted for than the total of all the space in the 1950 show, reports James O. Rice, AMA secretary. Hotel reservations should be addressed to the Housing Bureau, AMA National Packaging Exposition, Central Pier, Atlantic City, N. J.

***Lift truck for coiled steel**—the completion of an 80,000 pound capacity industrial lift truck, the largest of its kind, has been announced by The Yale & Towne Mfg. Co. Built for handling steel, the truck has two snout-like rams on the front that open and close like a scissors. These rams provide unit that can carry one big coil of steel or two small ones.*



NEW DIVISION OF PACKAGING, MATERIALS HANDLING SOCIETY

The second regular meeting of the Philadelphia group of the Society of Industrial Packaging and Materials Handling Engineers was held on Monday, February 26, at the Benjamin Franklin Hotel, in the rooms of the Traffic Club of Philadelphia.

Chief speaker at the meeting was H. T. Holbrook, of Standard Cap and Seal Corp., New York City, and formerly a member of the Army

Packaging Board. Holbrook's subject was "Industry's View of Military Packaging."

Ballots have been distributed to the membership for choosing a new name for the group which has separated from the Eastern Division, whose center is in New York City. The results of the ballot will be announced later in *finish*.

Officers of the Philadelphia group of SIPMHE, elected in January, are: President, Herbert M. Lapidus, Naval Aviation Supply Office; Executive Vice Pres., F. Robert Campbell, Armstrong Cork Co.; Vice Presidents, A. L. Manger, Rathborne, Hair & Ridgway Box Company, and Henry French, Electric Storage Battery Co.; Secretary, R. F. Tettemer, H. G. Hanline Co.; and Treasurer, Benjamin T. Brooks, Jr., Insurance Company of North America.

PEIN HEADS WOODEN BOX ASSN.

In the face of heavy current demands on the capacity of the wooden

box industry, resulting in maximum volume within limits of available lumber supply, an obligation to assist in supplying defense agencies with information and to cooperate toward providing experienced consultants and staff assistance was recognized by the National Wooden Box Association members at their annual mid-year meeting held recently in Chicago.

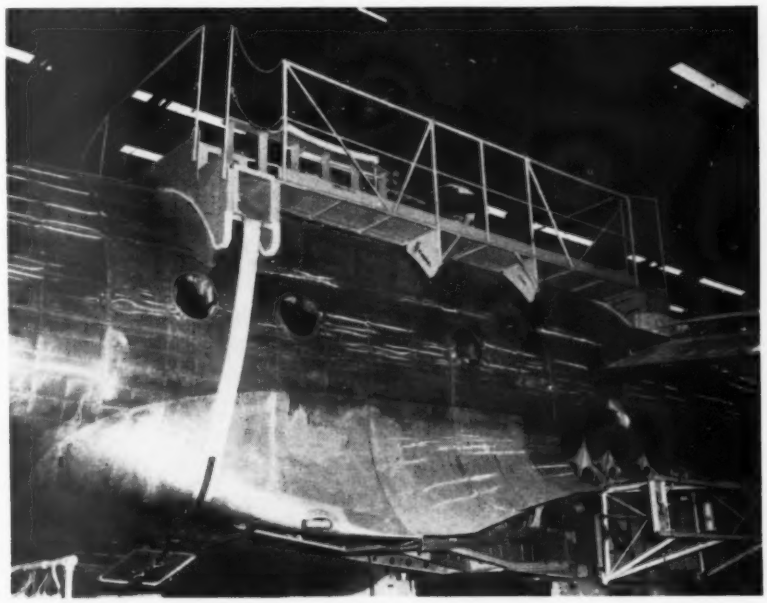
J. K. Cozier, of Cozier Container Corp., Cleveland, Ohio, and out-going Association president, presided over the sessions until election of the new president, H. H. Pein, of Pein Box Co. Oregon Ltd., Portland, and Tygh Valley Lumber Co., Tygh Valley, Oregon. Officers reelected were 1st vice pres., D. A. McNeill, Jr., of McNeill, Lauff & McNeill, Thomson, Georgia; exec. vice pres., C. D. Hudson, Washington, D. C.; and treasurer, P. John Galbraith, Philadelphia.

Newly elected were 2nd vice pres., Morris Milbank, of Rogue River Lumber Co., Grants Pass, Oregon, and 3rd vice pres., Robert F. Miles, of Rathborne, Hair & Ridgway Box Company, Chicago.

The following were elected members of the executive committee:

J. K. Cozier; D. A. McNeill, Jr.; J. D. Bronson, Cascade Lumber Co., Yakima, Wash.; H. S. Dunning, J. H. Dunning Corp., New York City; J. C. Anderson, Gideon-Anderson Lumber Co., Gideon, Mo.; C. H. Strauss, Ironbound Box Co., Hillside, N. J.; W. B. Wood, Mancuso Barrell & Box Co., Kenner, La.; and P. V. Burke, Sacramento Box & Lumber Co., Sacramento, Calif.

CARGO HOLDING STRAP USED IN AIRCRAFT ASSEMBLY



Strap assemblies originally designed for holding cargo in flight are now being used at Lockheed Aircraft Corporation to secure scaffolds to the top of Constellation fuselages during assembly operations. Due to a special buckle-grip, the straps are quickly set with any desired degree of tension, yet are instantly released. Once set, the buckle prevents any slippage or backlash. The strap assemblies are available in 1", 1½" and 2" widths with optional fittings and hooks of many styles.

SIGNODE REDESIGNS TRADE-MARK

Shown here is the new trade-mark adopted by Signode Steel Strapping Company, of Chicago, Illinois. The trade-mark retains the "girdled globe" motif (indicating worldwide service), familiar to Signode customers for the past 30 years. Signode reports that company agencies are active in Argentina, Australia, Brazil, Canada, Cuba, England, Iceland, India, Mexico, Peru, Puerto Rico, Sweden, Switzerland and Uruguay. These agencies service industries and

shipping interests in many other countries. Signode services its customers throughout the United States from branch offices in 45 cities. In addition, special service is maintained for defense and other departments of the U. S. Government.

MATERIALS HANDLING EQUIPMENT MFRS. MERGE

The merger of Crescent Truck Company, of Lebanon, Pa., with Barrett-Cravens Company, of Chicago, has been announced by A. M. Barrett, president of the latter. It was stated that Crescent will be operated as a division of Barrett-Cravens which now has a complete line of "floor level" materials handling equipment with the addition of Crescent industrial trucks and tractors.

Another recently announced merger is that between The Baker-Raulang N. Y. Corp. and Material Handling Equipment Co. The new organization, to be known as Material Handling Equipment Co., with main offices in New York City, will offer engineering service on certain lines of industrial trucks, motorized "walkie-type" trucks, prefabricated pallet racks, multi-purpose pallet and rack combinations, and dock boards for truck or freight car loading.

MMM EXPANSION IN CHICAGO

Recent purchase by Minnesota Mining & Manufacturing Co. of a 114-acre tract in southwest Chicago is part of a long range industrial development, C. P. Pesek, vice president in charge of engineering, has announced.

Pesek said a $3,000,000 plant now under construction for Mid-States Gummed Paper Co., a MMM subsidiary, is the initial project.

NEW WIREBOUND ASSN. HEAD IS DEFENSE PACKAGING EXPERT

A. L. Whiton, of Chicago Mill and Lumber Company, Chicago, was elected president of the Wirebound Box Manufacturers Association at its annual meeting in New Orleans, February 9. He succeeds Norris W. Embry, of General Box Company, Chicago, who was named vice president.

Two new directors also were elected. They are Kenneth H. Leash, of Portland, Oregon, and W. J. Pierpont, of Savannah, Georgia.

Whiton is widely known in the shipping container industry. He served throughout World War II as a civilian consultant, some of the time overseas. He began his government service in 1941 as a field consultant for the Forest Products Laboratory, assigned to the Ordnance Department. He became chief field consultant in 1942. In 1944 he was transferred to the Ordnance Department itself as Chief of the Packaging Branch, Office of the Chief of Ordnance, where he served until September, 1945.

WIREBOUND BOXES and CRATES
WOODEN BOXES and CRATES
CORRUGATED FIBRE BOXES
BEVERAGE CASES
STARCH TRAYS
PALLETS

The SUPERSTRONG box or crate for your product is on our designer's table.

SUPERSTRONG engineering and production "know-how"—based on nearly a century of experience—can create the type and size of shipping container that gives you greater overall economy through efficient construction, reduced space requirements, less shipping damage.

No obligation—just an opportunity to let us give you all details.

RATHBORNE, HAIR AND RIDGWAY BOX CO.
1440 WEST 21st PLACE • CHICAGO 8, ILLINOIS

NEWS → *from Page 50*

duction and John M. Crouse will become sales manager for Whirlpool division products.

In his newly created post, Mitchell will be responsible for all home laundry equipment sales. The position also includes supervision of foreign operations, directed by Gardiner S. Platt, and customer service which is under James R. Chapman.

NEW INGERSOLL EXECUTIVE

Thur Schmidt has been appointed assistant to the president, Ingersoll

Products Division, Borg-Warner Corporation. He previously was general manager of Highway Steel Products Co., Chicago Heights, Ill. During World War II he served as a consultant in research and development with the Quartermaster General Staff. Schmidt will handle product development for the Ingersoll Products Division.

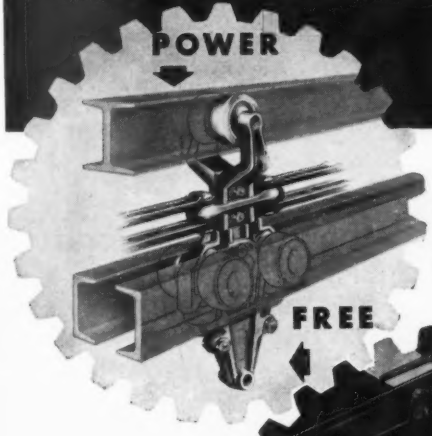
SAYRE NAMED AVCO VICE PRES.

Judson S. Sayre, general manager of the Bendix Home Appliances Division, has been elected a vice president of Avco Manufacturing Corp., which recently acquired Bendix.

ENAMELWARE GROUP ELECTS HELD

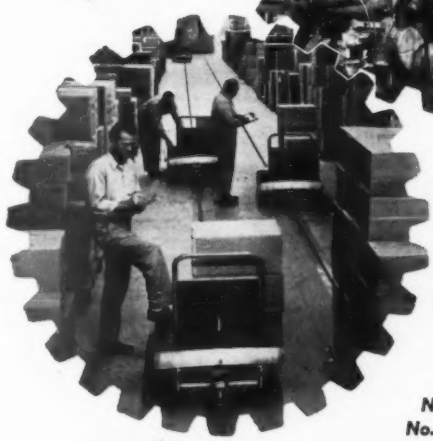
Henry J. Held, vice president of Universal-Rundle Corp., Milwaukee, has been elected chairman of the Enameled Cast Iron Plumbing Fixtures Association.

WEBB ENGINEERING PLUS MODERN CONVEYOR EQUIPMENT SYSTEMS MEET ANY MATERIALS HANDLING REQUIREMENT



POWER and FREE Conveyors provide essential *flexibility* to meet specific production problems. The *free* lines, integrated with the *power* lines, allow for any timing schedule.

TOWVEYOR Systems reach all plant or warehouse areas... multiply tonnage moved, expedite handling orders . . . reduce costs to a fraction. Trucks may be disengaged at any point by raising pin.



TROLLEY CONVEYOR SYSTEMS combine highest efficiency with low cost . . . constitute the greatest "assist" to modern mass production. Operating in hundreds of manufacturing plants, they handle all types of materials from light parts to massive loads.

ASK FOR CATALOGS
No. 46 TROLLEY CONVEYORS
No. 51 FLOOR TYPE CONVEYORS

JERVIS B. WEBB COMPANY
MANUFACTURERS OF OVERHEAD AND FLOOR TYPE CONVEYORS

OFFICES IN PRINCIPAL CITIES
8913 ALPINE AVE.
DETROIT 4, MICH.

DEFENSE PROBLEMS STUDIED BY KITCHEN CABINET GROUP

At the February 14 meeting of the Steel Kitchen Cabinet Institute, held at the Cleveland Hotel, Cleveland, Ohio, the largest number of executives in the history of industry meetings were in attendance, according to Arthur J. Tuscany, executive secretary of the Institute.

An important decision was that the industry would take steps to establish a committee to give assistance at Washington. The first purpose of this committee would be to place industry facilities at Government disposal to serve where they are needed most. The second purpose would be to give the proper departments assistance in developing industry information and otherwise helping to determine just what might be necessary in the way of any change in available raw materials.

BILLION DOLLAR SALES GOAL FOR ELECTRIC HOUSEWARES

Electric housewares distributors and dealers visiting the Housewares Show in Chicago at the Navy Pier, January 18-25, witnessed the opening phase of a full-scale merchandising and promotional campaign designed to help them capture a larger share of the profitable year-round gift market. This campaign is sponsored by the Electric Housewares Section of the National Electrical Manufacturers Association, and has as its theme: "Give Electric Housewares—First Choice for Every Gift Occasion."

In 1950 the electric houseware's industry's retail total was $600,000,000. The new goal is a billion dollar share of the multi-billion dollar gift market.

AGA TO SPEND $1.7 MILLION FOR INDUSTRY PROMOTION

The Committee on Promotion, Advertising and Research (PAR) of the American Gas Association recently approved expenditures of nearly $1,700,000 for the gas industry's coordinated programs in these fields for 1951, according to Norman B. Bertolette, president of The Hartford Gas Company, and chairman of the PAR Committee.

It is estimated that about $600,000 will be spent for national advertising on domestic gas ranges, gas refrigerators, gas water heaters and gas clothes dryers. About $13,500 will be devoted to advertising in architectural and building publications, and about $130,000 in business, trade and college publications, advertising commercial and industrial utilization of gas.

EASTERN ENAMELERS DISCUSS LOW PRESSURE SPRAYING

At the February 17 meeting of the Eastern Enamelers Club, in Philadelphia, the feature subject was the "Low Pressure Spraying of Porcelain Enamel" by Stan Sheldon, senior process engineer, Frigidaire Division of General Motors *(see feature article in this issue)*. Sheldon was assisted in the presentation by other authorities on spray finishing.

GAS WATER HEATER SHIPMENTS UP 73.3 PER CENT

During January, industry shipments of automatic gas water heaters totaled 228,100 units, or 73.3% greater than 131,600 units shipped during January of last year, according to figures released by the Gas Appliance Manufacturers Association.

WESTINGHOUSE RECEIVES INDUSTRIAL ENGR. MERIT AWARD

Westinghouse Electric Corporation's automatic washer and clothes dryer have received the Merit Award of the American Society of Industrial Engineers. The award was presented "because they are sound in engineering principle and design, produced from correct materials and manufactured in strict conformance to the accepted standard of quality controlled production processes." The presentation was made by Robert L. Crinnian, president of ASIE.

MYERS GETS NEW POST AT AMERICAN STOVE

Merit Myers, formerly production manager of American Stove Company's St. Louis domestic range factory, has been named to the newly-created post of director of production planning, it was announced by George P. Eichelsbach, Jr., vice president in charge of manufacturing.

In his new position, Myers will be charged with the responsibility of planning over-all company production and relating it to factory capacities. He will act as coordinator between the firm's four plants and their individual production managers.

OSCAR LENNA DIES

Oscar Lenna, president of Blackstone Corporation, Jamestown, N. Y., died January 25 at the age of 74. His death came in the midst of executing million-dollar expansion plans, including a 240,000 square foot plant addition just reaching completion.

Mr. Lenna was very active in the affairs of the American Home Laundry Manufacturers Association, and was formerly vice president of the group.

JANUARY GAS RANGE SHIPMENTS UP 36 PER CENT

During the month of January, 1951, industry shipments of domestic gas ranges totaled 225,100 units, or 36.4% greater than 165,000 units shipped during January, 1950.

DUO-THERM, NEWARK STOVE, AND PRENTISS WABERS CERTIFIED FOR SAFE TRANSIT

The National Safe Transit Committee has announced the certification of *Duo-Therm Division, Motor Wheel Corporation*, Lansing, Michigan; *Newark Stove Company*, Newark, Ohio; and *Prentiss Wabers Products Company*, Wisconsin Rapids, Wisconsin. This brings to 67 the number of manufacturers of home appliances and allied metal products now cooperating in the National Safe Transit Program.

• HAND ROLLED GRINDING BALLS

Made from specially developed vitreous porcelain body and hand rolled for faster, uniform grinding. Mill tested and individually inspected before shipment to you.

• MILL LINING BRICK

Low in glass content, McDanel Mill Lining Brick gives maximum resistance to wear and long, satisfactory service. Complete size range to fit every size mill.

• MILL HEAD ASSEMBLIES

Be sure to specify McDanel Mill Head Assemblies on your new mills. No metal can contaminate your mill charge with these patented covers. They are tops for uniformity of batch and long service.

• METAL COVERED GRINDING JARS AND MILLS

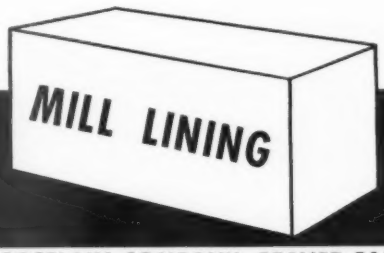
Protected with heavy gage steel jacket McDanel Metal Covered Grinding Jars and Mills are easy to handle, easy to clean, discharge rapidly and stand up under long usage.

Write Today for 1951 Catalog
for full data on
McDanel Porcelain Products

Made of a specially developed vitreous porcelain, low in glass content with a tough, stony structure—and **extra-fired** for complete vitrification—McDanel Mill Lining Brick give long, satisfactory service.

The use of longer-lasting McDanel Mill Linings lengthens the time between re-linings, cuts replacement costs, and boosts production. McDanel Brick are made in sizes to suit all mills. For top performance and economy, specify McDanel on your next mill lining order.

West Coast Representative
Fernholtz Machinery Co.,
150 N. Norton Ave., Los Angeles, Calif.



McDANEL **BRICK**

McDANEL REFRACTORY PORCELAIN COMPANY, BEAVER FALLS, PENNSYLVANIA
Chicago Vitreous Enamel Product Company, Cicero 50, Illinois
Exclusive Representative for the Enameling Industry

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Technical Assistant for Research Program

A civilian billet has been established for a Materials Engineer (Specialist in ceramic coatings). The job carries a Civil Service rating of GS-11, paying initially $5400 per annum. Administrative work—applicant must be capable of setting up and guiding technically-sound research programs on protective coatings.

Background desired — graduate school work and industrial experience.

Applications should be addressed to:

Chief, Bureau of Ships,
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Washington 25, D.C.
Attention Code 263

Low pressure spraying

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Ault, R. D. Beck, M. L. Pouilly, and J. B. Willis in the low pressure program at Frigidaire is hereby made.

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Adapted for *finish* from a paper before the Eastern Enamelers Club at Philadelphia, Pa., February 17, 1951.